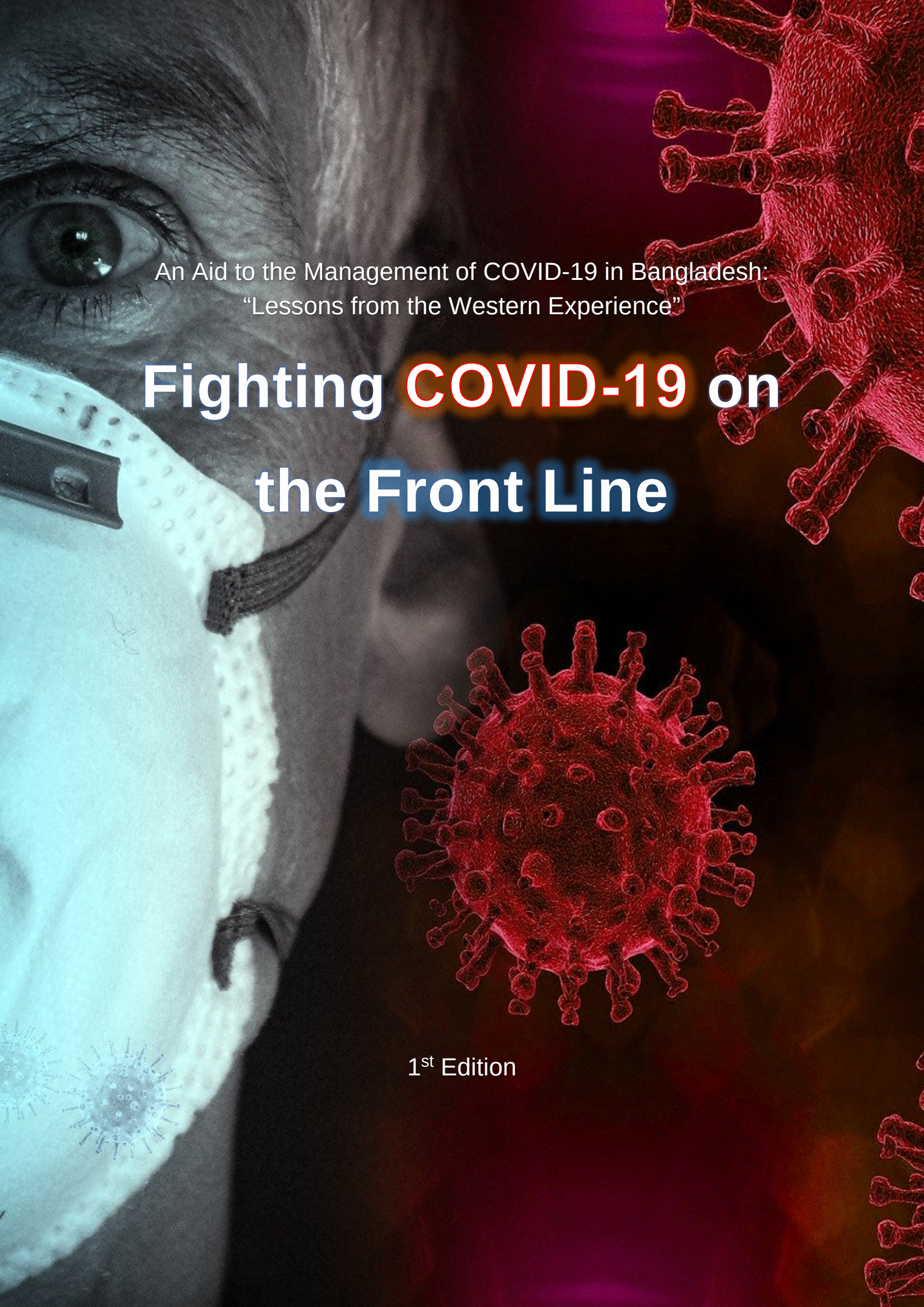

An Aid to the Management of COVID-19 in Bangladesh:
"Lessons from the Western Experience"

Fighting COVID-19 on the Front Line

1st Edition

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First Edition is published on May 2, 2020

This guidebook is available free for download and distributing from the following website (also future updates)

shakilfarid.com/covid19

PREFACE

Throughout the world, health authorities are facing unprecedented difficulties in dealing with the current COVID-19 crisis. Authorities in Bangladesh have already formulated robust national guidelines with the help of local experts. This handout is a small effort by some highly-motivated Bangladeshi doctors living in the UK and USA to supplement local guidelines in Bangladesh. This will hopefully enable local experts in Bangladesh to be kept updated about local treatment protocols worldwide for this difficult group of patients. In the absence of evidence for specific drug therapy, mostly supportive treatment is provided throughout world. Specific drug therapy is provided to only a select group of patients who are enrolled within a clinical trial. This document has been edited by two very experienced and well-respected Bangladeshi editors in order to make it more relevant for Bangladeshi doctors. We are very grateful to our authors for giving their valuable time despite being completely inundated with work during this pandemic. Most of the materials are adapted from the most recent national guidelines in the UK (NHS England, NICE, NHS Improvement, UK Royal Colleges, Public health England, WHO, CDC, Trust Intranets) and modified for Bangladesh. This handout will be updated regularly as we learn more about the disease and the guidelines get updated.

On behalf of the authors

Dr. Shakil Farid ***MBBS (SSMC), FCPS, MRCS Ed, FRCS (C-Th), MBA (Heath Executive)***

Consultant Cardiac Surgeon, Oxford University Hospitals NHS Trust. Oxford, United Kingdom

Website: http://shakilfarid.com Correspondence: shakil.farid74@gmail.com

2nd of May, 2020

INTERNATIONAL EDITORS

EDITORS FROM BANGLADESH

*Our little effort is dedicated to **Dr. Abdul Mabud Chowdhury (Faisal)** (CMC) and all the other front line health care workers who died on the line of duty. **Dr. Faisal** was a dear friend of the authors of this book. He was a Consultant Urologist at Homerton University Hospitals.He died of COVID-19 few weeks after raising concerns about the lack of PPE to the UK government. He was a great humanitarian, leader and visionary. He will be missed by all of us.*

List of Contributors:

Dr Moshfiq Abeer MRCP(UK), MRCP(Resp Med)

Consultant Respiratory Physician, Hull and Yorkshire Hospital, UK.

Prof AKM Akhtaruzzaman MBBS, DA, MD

Professor and Chairman, Department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh

Dr Kazi Asif Adnan MBBS, MRCP(UK)

Consultant Interventional Cardiologist, Sandwell and West Birmingham Hospitals NHS Trust, UK

Prof Shafi Ahmed PhD, FRCS (General Surgery)

Prof of Surgery, Laparoscopic Colorectal Surgeon, The Royal London Hospital, UK.

Dr Nashid Noor Alam MBBS MRCP MRCP (Geriatric Medicine) FRCP

Consultant Physician/Geriatrician/Stroke Physician, Antrim Area Hospital, Northern Health and Social Care Trust, Norther Ireland, UK.

Dr Iffat Azim MBBS MPH

General Practitioner, Harley Street Health Centre, London

Prof Tipu Zahed Aziz F.Med.Sci.

Prof of Neurosurgery, Nuffield Department of Surgery, Oxford University Hospitals NHS Foundation Trust, UK.

Dr Snehashish Banik MRCP(UK), FHEA(UK)

Consultant Acute Medicine and Acute Stroke, Aberdeen Royal Infirmary, NHS Grampian, Scotland.

Director, Academic Foundation Program, North Scotland Deanery.

Dr Verona Beckles Bsc, MBBS, MSc, MRCS(Ed), FRCS(Ed)

Consultant, Trauma & Orth, Queen's Hospital, Barking, Havering and Redbridge NHS Foundation Trust, UK.

Dr Sarah Choudhury MBBS. MRCP (ACUTE MEDICINE), FRCP, DIP MED SC (Medical Toxicology)

Consultant in Acute Medicine, Northwest Anglia NHS foundation Trust, UK.

Dr Shakil Farid MBBS FCPS(Surgery) MRCSEd, FRCS(C-Th), MBA (*Health Executive)*

Consultant Cardiac Surgeon with special interest in Aortic Surgery, Oxford University Hospitals NHS Foundation Trust, UK.

Dr S A Haider MBBS MRCP (UK)

Consultant Physician, Geriatrician and Stroke Physician, King's Mill Hospital, Sherwood Forest Hospital NHS Foundation Trust, Birmingham, UK.

Dr Farzana Haque MBBS MRCP(UK)

Clinical Research Fellow, Hull and York Medical School, Specialty Registrar Oncology, Queens Oncology Centre, Hull Teaching Hospital, UK.

Dr Tahmina Haque MBBS MRCPsych Dip in Psychiatry

Consultant Psychiatrist, Leeds and York Partnership NHS Foundation Trust, UK.

Dr Omar Hasan MD FACC

Attending interventional Cardiologist, Clinical Assistant Professor Hackensack University Medical Center, NJ, USA.

Dr Mehedi Hasan MBBS, FCPS, MRCP, FRCPath

Consultant Haematologist, Lister Hospital, North and East Hertfordshire NHS Trust, UK.

Dr Nayeem Hasan MBBS

Specialty Doctor, Acute Medicine , West Suffolk Hospital NHS Foundation Trust, UK.

Dr Syed Shahreer Huq MBBS MRCP(Resp Med) FRCP RPSGT

Somnologist (ESRS), Consultant Respiratory and Sleep Physician, University Hospital Birmingham NHS foundation Trust, UK.

Dr Zahed Ikram MBBS, MRCP, FRCP

Consultant in Geriatric Medicine, Western Sussex Hospitals NHS Trust, UK.

Dr Javed Imam MBBS, MRCP

Consultant, Stroke Medicine, West Suffolk Hospital NHS Foundation Trust, UK.

Dr Tasbirul Islam MD, MRCP(UK), FRCP, FCCP

Clinical Associate Professor, Indiana University School of Medicine., Medical Director, Indiana University Arnett Hospital, USA.

Dr Bandana Rajbhandari Joshi MBBS FRCPCH

Consultant Community Paediatrician, Dip Neurodisability, St Mary's Hospital, Northamptonshire Healthcare NHS Foundation Trust, UK.

Dr Zahed Khan MRCP (medicine) MRCP (Medical oncology)

Consultant Medical Oncologist, Clatterbridge Cancer Centre NHFT, UK

Dr Jeenat Khan MBBS

Specialty Doctor, Geriatric Medicine and Stroke, South Eastern Health and Social Care Trust, Northern Ireland, UK.

Dr Rahila Khan MBBS, MRCOG, MD

Consultant, Obstetrician and Gynaecologist, Lead in Maternal Medicine and Diabetic Pregnancy, *Worthing Hospital, UK.*

Dr Samia Mubin MBBS FCPS MRCS

Associate Professor of Surgery, BSMMU, Dhaka, Bangladesh.

Dr Quazi Rezina Naquib MBBS, DCH, MRCPCH

Paediatrician, East Kent Hospitals University Hospitals Foundation TrsKent, UK.

Dr Quazi Selina Naquib MBBS, MRCOG, DFFP

Obstetrician and Gynaecologist, Whips Cross University Hospital, London.

Dr Ashrafun Nessa MRCS, MCPS FCPS

Specialty Registrar, General Surgery, Aberdeen Royal Infirmary, NHS Grampian, Scotland, UK.

Dr Sharmin Afroz Panna MBBS MSc (Psychiatry)

Specialty Doctor, Specialist Secure Unit, Mental Health, Merseycare NHS Foundation Trust, UK.

Dr Jhumur Pati MBBS FRCS FRCS (UROLOGY)

Consultant Urological Surgeon, Homerton University Hospital and Barts Health NHS Trust, UK.

Dr Shama Parveen MBBS MRCPsych

Consultant Psychiatrist in Intellectual Disability, Sussex Partnership Foundation NHS Trust, UK.

Dr Sabyasachi Roy MBBS

Internal Medicine Trainee, Royal Cornwall Hospitals NHS Trust, UK.

Dr Shahriar MD Sadek MBBS MRCSEd, FRCS

Consultant General and Colorectal Surgeon, Royal London Hospital, Barts Health NHS Foundation Trust, UK.

Dr Lunik Rollei Sarder MBBS MRCEM FRCEM

Emergency Medicine Consultant, Queen's Hospital, BHR University Hospitals NHS Trust, UK.

Dr Rana Sayeed *MBBS MRCP (UK) FRCS (CTh) PhD*

Consultant Cardiac Surgeon and Clinical Lead, Oxford University Hospitals NHS Foundation Trust, UK.

Dr Kazi Fatema Shahadat MBBS, MRCGP

GP Partner and Trainer, Betts Avenue Medical Centre, Newcastle, UK.

Dr Afroza Shameen MMedSci (UK), MBBS(DU)

Specialty Doctor, Accident and Emergency, Doncaster Royal Infirmary, Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust, UK.

Dr Arifa Siddika MBBS, MRCS, FRCS (Gen and Colorectal Surg)

Consultant, General and Colorectal Surgery, Homerton University Hospital, London, UK.

Dr Quazi Mahmud Siddiqui MBBS, FCPS, FRCA

Consultant Anaesthetist, Rockhampton Base Hospital and Senior Lecturer, University of Queensland Rural Medical School, Queensland, Australia

Dr Tasmin Sultana MBBS

Specialty Doctor, Trauma & Ortho, Queen's Hospital, Barking, Havering and Redbridge NHS Foundation Trust, UK.

Dr Farhana Tasneem Rimi MBBS MRCP

Clinical Research Fellow (Cardio), University Hospital Leicester NHS Trust, UK., Clinical PhD student, Cadiovascular Science and Sports Physiology, Loughborough University, UK.

Dr. Muhammad Shamse Tabriz MD

Consultant, Infectious Disease, Advocate Christ Medical Center, Clinical Associate Prof of Medicine, University of Illinois, Chicago, USA.

Dr Md Zaker Ullah MBBS, FRCSEd, FRCS (Gen and Breast Surg)

Consultant General and Oncoplastic Breast Surgeon, Whipps Cross University Hospital, Barts Health NHS Trust, UK.

Table of Contents

1. COVID 19 – Key Recommendations

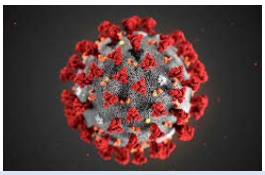
- Focus of management is supportive care. The vast majority of patients recover without any intervention and can be managed at home.
- There is no proven pharmacological therapy. None are currently recommended outside the remits of clinical trial.
- All hospitals should accept COVID 19 patients who require hospitalization. This can be done by having **COVID (red),** **suspected COVID (amber)** and **non-COVID (green)** zones in each hospital.
- Tests for COVID 19 have significant percentage of false negatives. If suspicion remains high, the patient should be treated as COVID 19 based on clinical judgement and test should be repeated.
- Correct oropharyngeal and nasopharyngeal swab collection technique is vital to reduce false negative tests. Regional testing facilities should be available throughout the country.
- For critically ill patients, careful fluid (avoid excessive fluid) balance and oxygen administration is the mainstay of therapy. SaO2 target of 88-96% should be the aim.
- Consider trial of HFNC, (CPAP and NIV where facilities are available), awake proning before mechanical ventilation.
- Remember the risk of acute kidney injury. Review medications, maintain euvolemic status and treat shock.
- COVID 19 patients have increased cardiac complications. Observe for features of cardiovascular disease.
- Use thromboprophylaxis for all hospitalized patient with COVID 19.
- Personal Protective Equipment (PPE) – for general contact with confirmed or suspected COVID 19 patients, surgical mask, disposable apron and gloves should be worn. For aerosol generating procedures, eye protection, FFP3, FFP2, KN95, N95 mask should be worn, along with long sleeve fluid resistant gown and gloves. Strict hand washing, donning (putting on) and doffing (taking off) procedure should be followed.

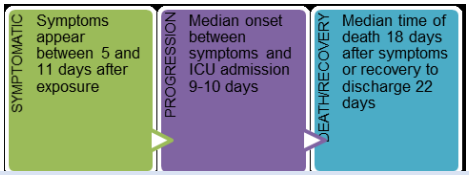
- Healthcare personnel do not need to self-isolate if they have been in contact with a patient with COVID 19. They can carry on providing patient care with appropriate PPE unless symptomatic or tested positive for COVID 19.

- Healthcare personnel must isolate at home and should contact a health professional for advice if they get symptoms of COVID 19.
- Watch out for atypical presentations in older people – falls, confusion etc.
- Researchers all over the world are trying to develop a vaccine for Covid19. **Sarah Gilbert** in Oxford is hoping to make one available by the Autumn this year, by using the 'challenge trial' method, i.e. exposing fit young volunteers to the disease. However, there are concerns that if it turns out that infection with Covid-19 does not lead to lasting immunity, vaccination also will not give immunity for long. Moderna Therapeutics in USA are also hoping to launch a vaccine by Autumn this year.

2. COVID-19 severity scoring tools Non-ICU Management

Dr. Mosfiq Abeer, Dr Farzana Haque, Dr Afroza Shameen, Dr Tasbirul Islam





Case definition for possible case:

1. Clinical or radiological pneumonia ***or***
2. Acute Respiratory Distress Syndrome ***or***
3. Influenza like illness

CLINICAL ASSESSMENT for those who *may* require hospital admission

- House in side-room or cohort area and wear personal protective equipment according to local guidance
- History, examination and standard observations (pulse, RR, BP, temperature, pulse oximetry, capillary refill time)
- If not known positive AND requires admission do nasopharyngeal swab

SEVERITY ASSESSMENT

- **Consider the following risk factors for mortality:**
- Older age group: Mortality high over 60 years
- **Co-morbidity: especially cardiac / hypertension, diabetes, COPD/Asthma, current smoker, obesity**
- **Immunocompromise: HIV/AIDS, severe malnutrition, Chronic steroid use, Immunosuppressive medication, ongoing anti-cancer treatment**
- Sepsis red flags (see box below) and Severity scoring tool (see box below)
- Severe acute respiratory distress
- Low functional status and / or poor social circumstances
- High risk relative at home and unable to self-isolate (may be unrealistic in pandemic)

CONSIDER the following tests according to comments below and necessity for admission or clinical decision making:

- FBC, BCP, CRP, Blood Culture (if fever or sepsis or severe illness) *before* antibiotics- Expect Lymphopenia, high CRP and AKI
- Chest radiograph for ALL patients needing admission to hospital- **Typically patchy ground glass opacities peripheral , basal and bilateral (unilateral in 25%)**
- ECG (Do Troponin T if new changes)
- Nasopharyngeal swab (broad-based respiratory PCR)- **As sensitivity is not 100%, one negative swab does NOT rule out COVID. Send a second swab, and sputum, if clinical suspicion high.**
- Consider COVID prognostic indicator- D-dimer, ferritin– high values indicate cytokine storm/MAS
- Consider early chest CT/CTPA specially if PE is suspected- **ground-glass opacities (GGO): bilateral, basal, peripheral: sensitivity around 80%**

POTENTIAL COMPLICATIONS

- Acute Respiratory Distress Syndrome and Respiratory Failure
- Sepsis +/- Septic Shock
- Disseminated Intravascular Coagulation
- Pulmonary Embolism
- Arrhythmias / Heart Failure

Use

COVID-19 Severity Assessment tool

ASK-ASSESS-SCORE-GRADE

https://bit.ly/2yaqhXK

SEPSIS RED FLAGS

- New altered mental state
- RR ≥25 *or* new need for ≥40% O2
- Heart rate ≥130/min
- sBP <90mmHg
- No urine in last 12 hours (or <0.5ml/kg/hr)
- Lactate >2 (if >4 refer to critical care)
- **Coagulopathy**

FBC: Full blood count (same as CBC for Bangladesh), BCP: Biochemical profile (Liver function test, renal function test, electrolytes, Ca etc.)

COVID-19 SEVERITY SCORING TOOL

START HERE:

ASK

		Score – circle only those that apply
Comorbidities	>2 comorbidities *or* Immunocompromised *or* Cardiovascular disease	2

COMORBIDITIES:
- ☐ Hypertension
- ☐ Diabetes
- ☐ COPD/Asthma
- ☐ TB
- ☐ Current smoker

IMMUNOCOMPROMISE:
- ☐ HIV/AIDS
- ☐ Severe malnutrition
- ☐ Chronic steroid use
- ☐ Immunosuppressive medication
- ☐ Ongoing cancer treatment

ASSESS

		Score – circle only those that apply
Mobility	With help	1
	Stretcher	2
Assessment	Difficulty breathing *or* Unresponsive	3
Temperature	≤ 35 (Fahrenheit ≤95*, ≥101*)	2
	≥ 38.5	3
Pulse	≤ 45	2
	≥ 110	3
Respiratory rate	≤ 9	2
	20 - 27	2
	≥ 28	4
Systolic BP	≤ 90	4
	≥ 160	2

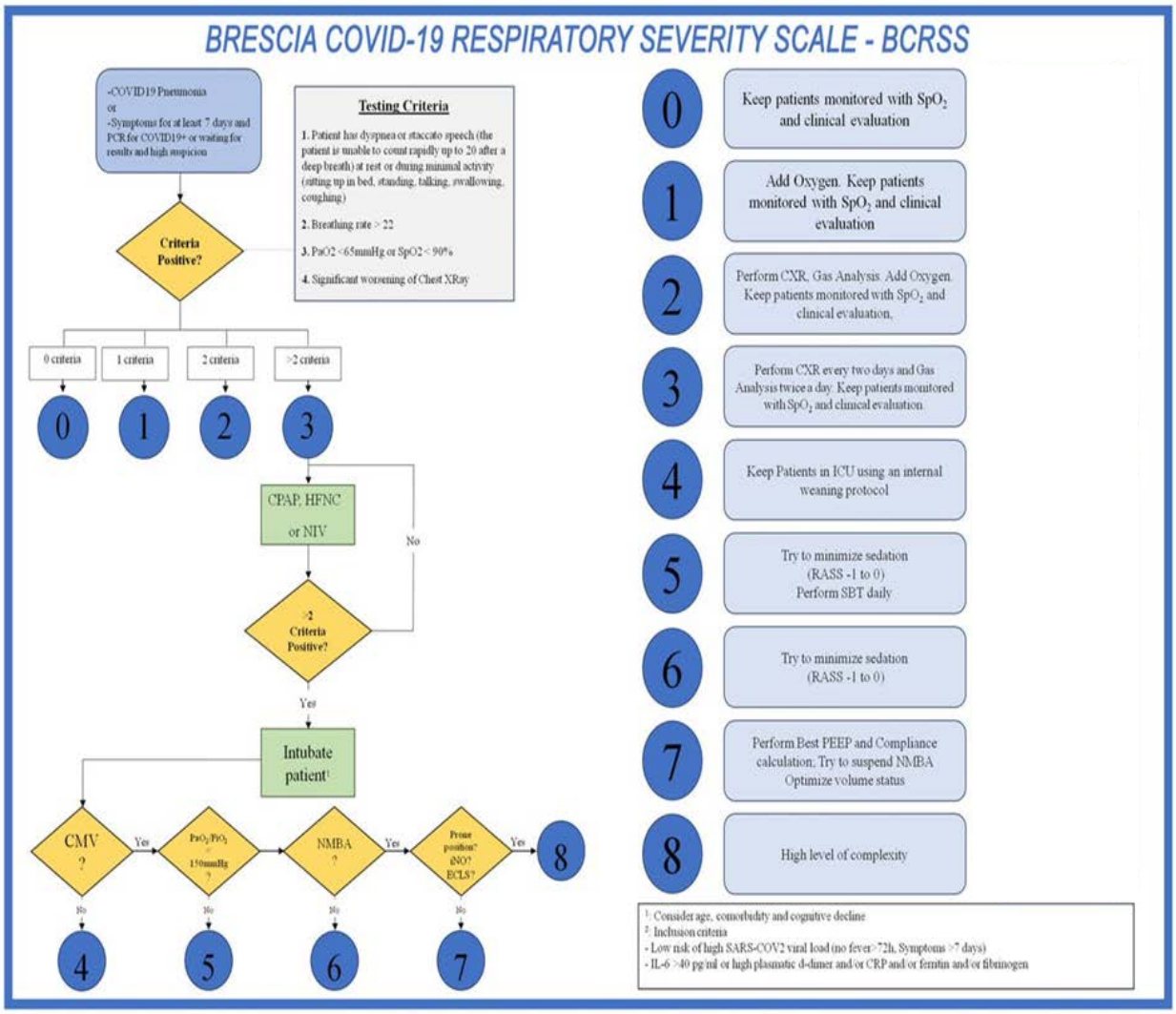
SCORE

Total (add all those circled):

GRADE

1-4: GREEN MILD / MODERATE	5-7: YELLOW SEVERE	8+: RED CRITICAL
Less likely to need oxygen.	Less likely to need mechanical ventilation. Likely needs oxygen.	Probably needs mechanical ventilation.

Ref: Wallis et at Afr J Emerg Med. 2020 Apr 2 (doi: 10.1016/j.afjem.2020.03.002)

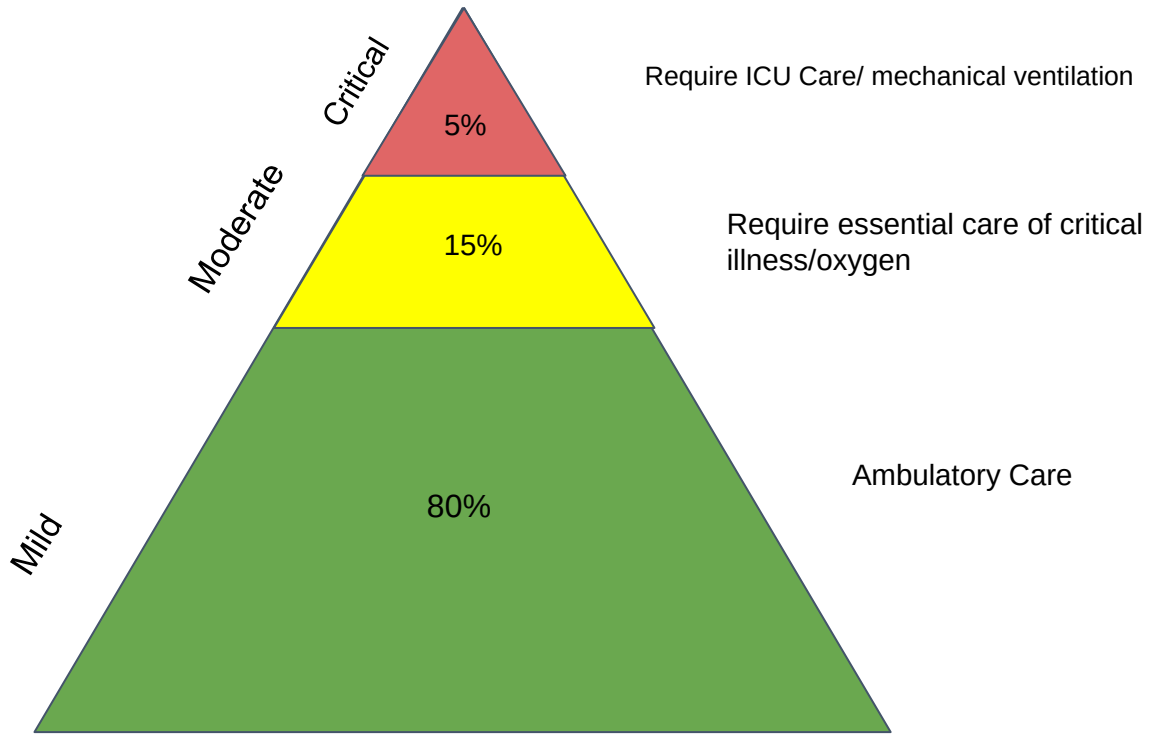


Ref: Duca Et al Emerg Med Pract. 2020 Apr 16;22(5 Suppl):CD1-CD2

Go to this website for an online version of the flowchart:

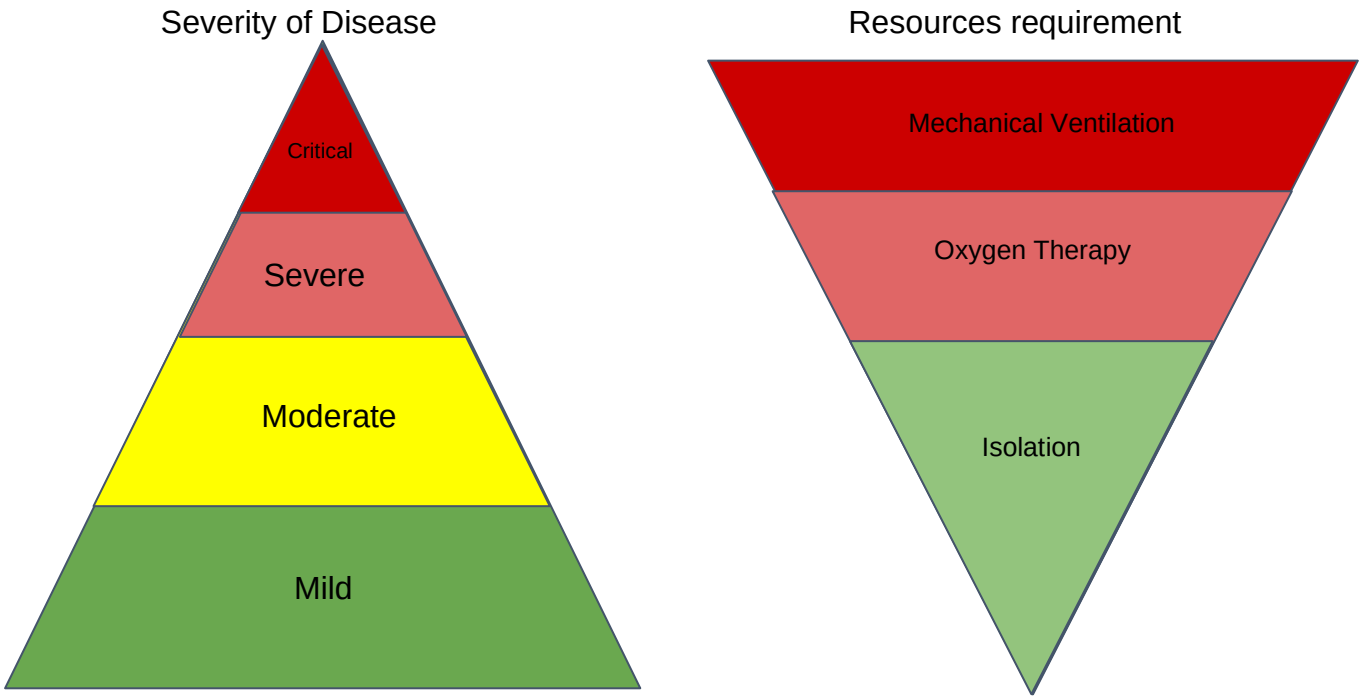
https://www.mdcalc.com/brescia-covid-respiratory-severity-scale-bcrss-algorithm

Severity Profile of COVID-19



Ref: https://afem.africa/resources/

How is care of COVID-19 patients determined?



1-4: GREEN
MILD / MODERATE
Less likely to need Oxygen

5-7: YELLOW
SEVERE
Less likely to need mechanical ventilation
Likely needs Oxygen

8+: RED
CRITICAL
Probably needs mechanical ventilation

Management – Non-Severe / Home
CATEGORY A PATIENTS
- Home (unless clinical judgement = NO)
- Analgesia and / or antipyretics as needed
- Oral fluids
- **Antibiotics:** If pneumonia or antibiotic indicated use Doxycycline 200mg once/day for 5 days

Pregnancy/alternative: Amoxicillin 500mg/8 hours for 5 days

Management – Non-Severe / Hospital
CATEGORY B PATIENTS
- Admit unless judgement = discharge is safe
- Oxygen as indicated (target SaO2 92-96%; 88-92% if risk of type II respiratory failure)
- **DVT prophylaxis with LMWH**
- Escalation plan to HDU/ICU
- Oral/IV fluids to maintain urine output ≥0.5mL/Kg/hour; target = euvolaemia
- **Antibiotics:** If pneumonia or antibiotic indicated, ORAL Doxycycline 200mg/24h 5/7

If NO oral route: IV Moxifloxacin or levofloxacin (Check QT prolongation/interactions risk) or Tazobactam/piperacillin
Pregnancy/alternative: ORAL Co-amoxiclav 625mg/8h 5/7 (or if IV Ceftriaxone 1g/24h)
Switch to oral ASAP when clinically indicate

Management – Severe/ Hospital/ Admit
CATEGORY C PATIENTS
- Oxygen as indicated (target SaO2 92-96%; 88-92% if risk of type II respiratory failure)
- Call critical care if respiratory distress
- **DVT prophylaxis with LMWH**
- Escalation plan to HDU/ITU
- Oral/IV fluids to maintain urine output ≥0.5mL/Kg/hour; target = euvolaemia
- **Antibiotics:** IV Moxifloxacin or Levofloxacin (Check QT prolongation/interactions risk) or Tazobactam/piperacillin

Pregnancy/alternative: IV Ceftriaxone 2g/24h *plus* IV Clarithromycin 500mg/12h
Switch to oral ASAP when clinically indicated

RESPIRATORY SUPPORT

Oxygen Maintain Sats 92 - 96% (88-92% in known COPD with CO2 retention) Target lowered anticipating shortage of oxygen supply

Nasal Cannulae 1-5 litres/min

Hudson mask 5-10 litres/min

Non rebreathe mask – 10-15 litres/min

Reserve Fixed performance Venturi masks (40%-60%) for those at risk of hypercapnia

FLUID MANAGEMENT
- AVOID vigorous fluid resuscitation – patients *rarely* shocked on admission (it may exacerbate ARDS)
- Assess fluid status and encourage oral rehydration where possible
- Consider gentle IV fluid to cover insensible losses (high Temp and RR) - max 2 litres/day

REMEMBER
- Antiviral or other immunomodulatory medications should only be used as part of a clinical trial, **NO TREATMENT HAS PROVEN BENEFIT YET**
- Empirical antibiotics for suspected bacterial pneumonia
- Corticosteroids should NOT generally be used (unless for co-existent indication)
- Prone positioning – see below
- **Thromboprophylaxis** – It is a hypercoagulable condition

PRONE POSITIONING IN COVID-19 Oxygenation in patients ventilated on Intensive Care improves significantly with intermittent prone positioning It is less clear whether this intervention improves symptoms or outcomes in pre-Critical Care patients but anecdotally it does

When to *consider* discussion with Critical Care Team?

- Severe acute respiratory distress
- Persistent hypoxia SaO2 <92% or (if done) PaO2 <8Kpa ***despite*** maximal oxygen
- Progressive hypercapnia
- Severe acidosis (pH<7.26) ***or*** Septic shock despite resuscitation ***or*** Lactate >4

When to switch from IV to oral antibiotics?

- Oral route intact (*Orals:* Doxycycline, Moxifloxacin, Amoxicillin or Clarithromycin); Total 5/7
- Objective improvement for 24 hours (e.g. RR decreasing, SaO2 increasing, etc.

When to discharge home?

- Modifiable risk factors have objectively improved for at least 24hrs
- Ability to maintain oral intake and social conditions are acceptable
- Discharge after shower and in clean clothes
- Advise to seek attention if worsening
- Patients should not use public transport
- Patients should be advised to self-isolate for **14 days** *after* symptom onset
- Patients should be advised about hand and cough / sneezing, etc. hygiene

3. Keeping patients out of hospital

Dr Kazi Fatema Shahadat, Dr Iffat Azim

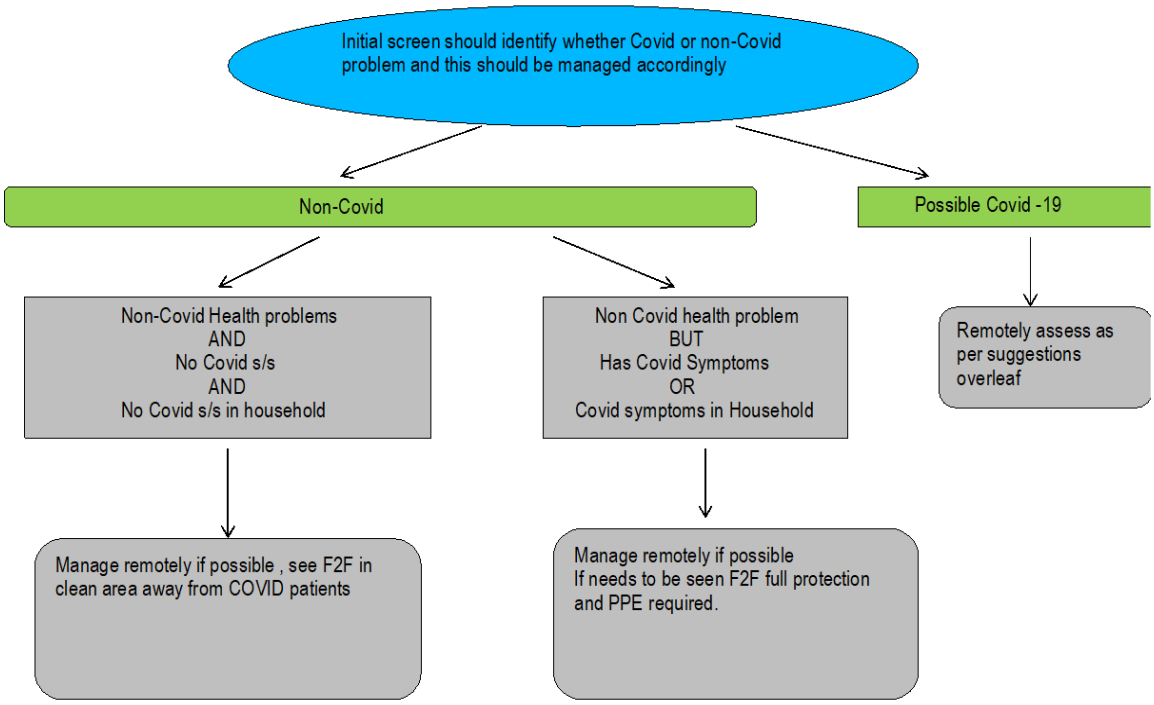
Why keep patients out of hospital:

- To avoid unnecessary admission and made bed available for sick patient.
- Minimize the health risks to staff, patients and wider communities.
- Most patients with COVID-19 can be managed remotely with advice on symptomatic management and self-isolation
- Although such consultations can be done by telephone in many cases, video provides additional visual cues and therapeutic presence

Tools for Remote Assessment:

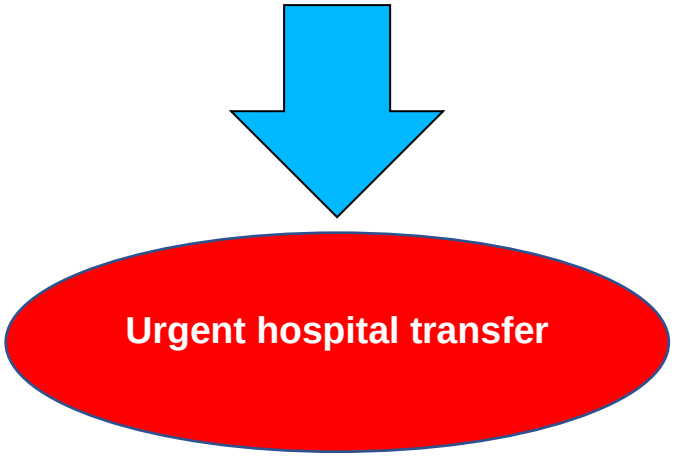
- Telephone consultations.
- Video consultations - AccuRx, Viber, WhatsApp, Facebook messenger apps etc. can be used
- Smart watch or smart phone. Use BP machine, Pulse oximeter, Thermometer at home.
- Hotline phone number

REMOTE ASSESSMENT FOR EVERY PRIMARY CONTACT



Red flags symptoms:

- Severe breathlessness or difficulty breathing.
- Pain or pressure in the chest.
- Blue lips or face.
- History suggestive of shock such as cold and clammy with mottled skin, new confusion, becoming difficult to rouse or significantly reduced urine output.
- Haemoptysis occurs in about 1% of covid-19 patients and seems to be a poor prognostic symptom.



Staying at home and shielding (High Risk group)

You're strongly advised to stay at home at all times and avoid any face-to-face contact if you're clinically extremely vulnerable to protect yourself. This is called 'shielding'.

Shielding means:

- Do not leave your house.
- Do not attend any gatherings. This includes gatherings of friends and families in private spaces, for example, family homes, weddings and religious services.
- Strictly avoid contact with someone who is displaying symptoms of Coronavirus (COVID-19). These symptoms include high temperature and/or new and continuous cough.

Living with other people during Self Isolation

- The rest of your household do not need to start shielding themselves, but they should do what they can to support you in shielding and to carefully follow the local protocols.
- At home you should:
- Minimise the time spent in shared spaces such as kitchens, bathrooms and sitting areas, and keep shared spaces well ventilated. Always keep separate towels for your yourself.
- **Keep 2 meters (3 steps) away from people you live with and encourage them to sleep in a different bed where possible.**

References

- Guidance and standard operating procedures- General Practice in the context of Coronavirus (COVID-19); Version 2.1 NHS England and NHS Improvement
- Primary care Pathways.co.uk/covid-19/clinical-assessment/pathways
- BMJ (British Medical journal)
- UK guidelines in Practice highlights
- GOV.UK website
- Red Whale GP Update
- www.nice.org.uk/guidance

4. Emergency Department Triage guideline for suspected COVID-19 Patients

Dr Lunik Rollei Sarder

Aim:

1. Effective early clinical diagnosis and initiation of treatment in any designated COVID-19 unit with standard or minimal or no investigation facilities.
2. Categorise suspected cases and early recognition of the level of care required.
3. Preventing transmission of disease to the community, other patients and care providers.

Settings:

1. **Isolated room for triage:** Assessment and documentation to take place in opposite corners of the room by different individuals to minimise contamination.
    a. Assessment corner: Assessment bed or trolley, nonfabric/synthetic mattress or cover.
    b. Documentation corner: Table, chair, patient notes, investigation forms, stationery for documentation ideally at least 6 ft away from assessment trolley.
    c. If possible to arrange separate entry or exit for the room and if not possible ensure free corridor for entry/exit to prevent droplet spread.
    d. If there is unidirectional airflow in the room, the arrangement should be such the flow maintain from documentation corner to assessment corner (source of air may be window/air conditioner)
    e. One patient to be allowed to enter the assessment room in any given time.
    f. No more than one accompanying attendant with the patient allowed in assessment room to prevent the spreading of disease.

2. **Required Team members:**(three persons)
    a. Assessment Doctor- one
    b. Nurse or Health care assistant to do observation - one
    c. Second doctor for documentation/ treatment prescription/ request investigations (not in contact of the patient)– one *(If the second doctor is not available, documentation can be done by Nursing staffs / Paramedics/ Medical assistants using simplified proforma attached).*

3. **Personal Protective Equipment:**
    a. Surgical face mask: for all team members (Need to be changed if moist or contaminated). N95, KN95, FFP2 mask and face shield for AGPs.
    b. Disposable polythene/ plastic apron for assessment doctor and nurse (Need to be changed in between every patient)
    c. Disposable gloves for assessing doctor and nurse. Need to wash hands in between every patient.

d. Care provider must not touch face without washing hands with soap for at least 20 seconds to prevent fomite transmission.

4. **Prevent transmission:**
    a. Patients and attendants to wear surgical face masks all the time.
    b. The bed mattress must be cleaned with an antiseptic *(eg: i. 70% isopropyl alcohol with 0.5% chlorhexidine or ii. appropriate antiseptic approved by Drug Authority Bangladesh)* after assessing every patient (and change of bedsheet every time where applicable) to prevent fomite transmission.
    c. Patient notes to be hand into patient's attendant (for non-admitting patients)/ or healthcare worker transferring the patient to the ward (for admitting patients) in a plastic envelope and wiped frequently to prevent fomite transmission.
    d. Social distance should be maintained where possible without any exception.
    e. Regular hand wash to be ensured.

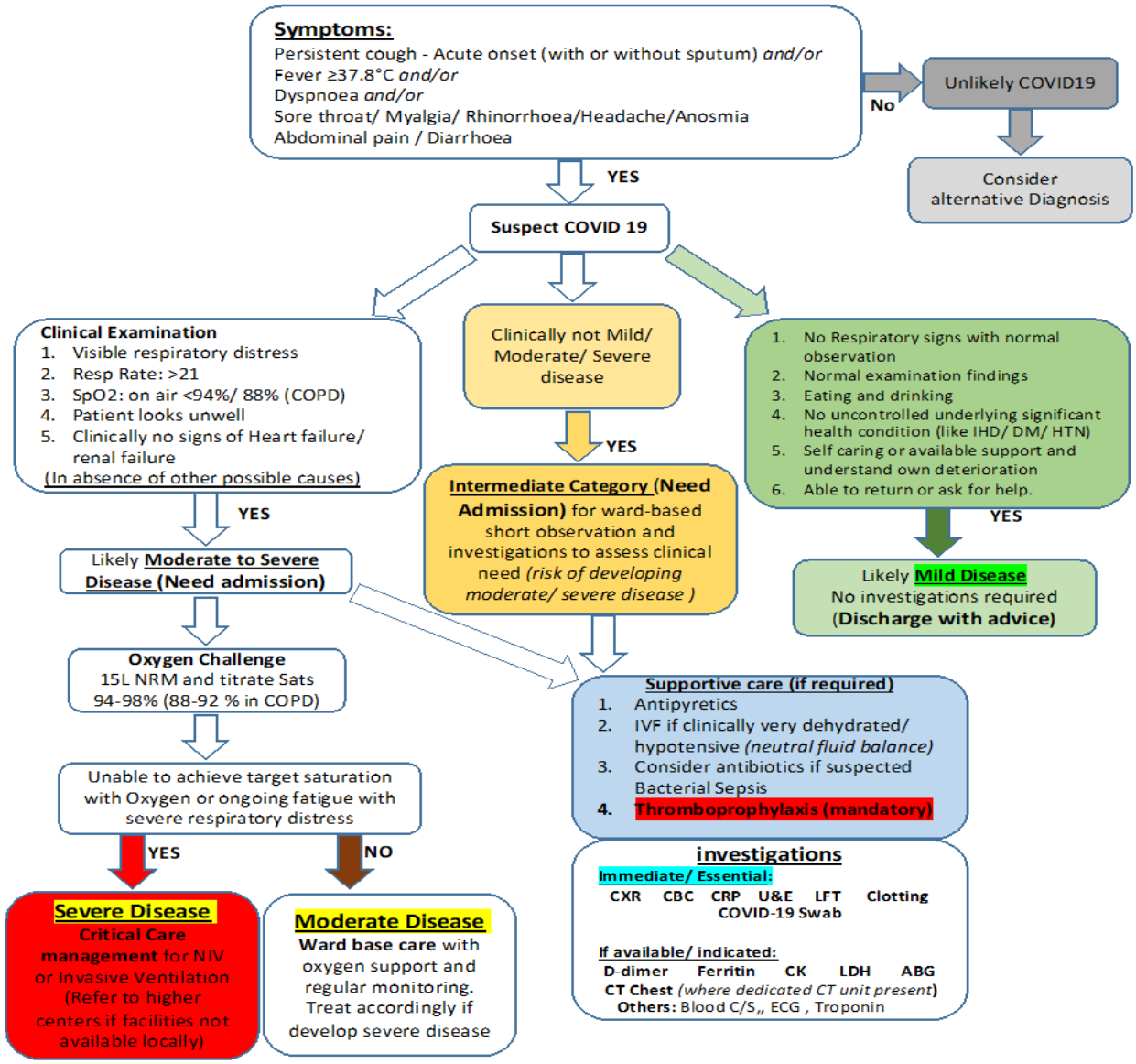
5. **Medical equipment:** Need to be wiped with an antiseptic *(eg. as above)* after assessing every patient.
    a. Blood pressure monitor
    b. Thermometer
    c. Pulse oximeter
    d. Stethoscope

Ref:

1. Specialty guides for patient management during the coronavirus pandemic Clinical guide for the management of emergency department patients during the coronavirus pandemic 17 March 2020 Version 1
2. World Health Organization. Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected. Accessed on March 20
3. COVID-19: investigation and initial clinical management of possible cases, PHE 18th March 2020
4. King's Critical Care – Evidence Summery Clinical management of COVID – 19
5. Loss of sense of smell as marker of COVID-19 infection - ENTU

Emergency Department Triage guideline for suspected COVID-19 Patients for Universal Healthcare Settings in Bangladesh:

Triage Flowchart



5. ICU Management

Dr Tasbirul Islam

RESPIRATORY FAILURE:

- It is conventionally defined by an arterial oxygen tension (PaO2) of <8.0 kPa (60 mmHg), an arterial carbon dioxide tension (PaCO2) of >6.0 kPa (45 mmHg) or both. **(Silent Hypoxia- Hypoxia without clinical symptoms, common in COVID-19)**
- Hypoxemic respiratory failure (type I) is characterized by an arterial oxygen tension (PaO2) lower than 60 mm Hg (<8 kPa) with a normal or low arterial carbon dioxide tension (PaCO2).
- Hypercapnic respiratory failure (type II) is characterized by a PaCO2 higher than 45 mm Hg (>6 kPa). Hypoxemia is common in patients with hypercapnic respiratory failure.

ARDS (Berlin definition):

- Acute onset <7 days
- Bilateral pulmonary infiltrate
- PaO2:FiO2 ration <300 on PEEP 5

ARDS severity	PaO2/FiO2	Mortality
Mild	>200, <300	27%
Moderate	>100, <200	32%
Severe	<100	45%

ARDSnet FiO2/PEEP table:

Lower PEEP/Higher FiO2

FiO2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0
PEEP	5	5	8	8	10	10	10	12	14	14	14	16	18	18-24

Higher PEEP/Lower FiO2

FiO2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5-0.8	0.8	0.9	1.0	1.0
PEEP	5	8	10	12	14	14	16	16	18	20	22	22	22	24

Resources:
http://www.ardsnet.org/files/ventilator_protocol_2008-07.pdf

In **SARS CoV-2 (Covid-19)** the pulmonary injury pattern is not entirely similar to ARDS, as hypoxia is prevalent and pulmonary compliance is generally high. In general, two categories of patients may be identified:

1. **High-pulmonary compliance patients with isolated viral pneumonia.**
    A) The main finding is hypoxic vasoconstriction, explaining the observed severe hypoxemia. In those patients, the major issue is related to perfusion, as lungs are inflated and increasing PEEP may not help.
    B) High PEEP and prone positioning do not lead to recruitment of collapsed areas, but they only adjust pulmonary perfusion.
    C) Pressure-Controlled, time-cycled ventilation may be a better choice to employ to improve oxygenation
    D) Respiratory rates should not exceed 20 breaths/min
    E) Tidal volumes generated may be much higher than 6 ml/kg (IBW) but should be tolerable as long as plateau pressure is maintained <30 cm H2O in normal BMI patients. May allow slightly higher plateau pressures based on BMI, chest wall thickness and other factors described in literature.
    F) Inverse Ratio Ventilation may be employed in view of above mechanics.
2. **Low-pulmonary compliance patients with lung injury pattern similar to traditional ARDS.**
    A) These may have concomitant bacterial or other co-infections or interstitial lung injury
    B) Standard ARDS net strategy should be used for tidal volume, plateau pressure and PEEP goals

Approach considerations:

1- **Low flow O2 delivery devices:**
Nasal cannula (up to 6LPM and provide up to 50% FiO2; Simple mask (up to 10 LPM and provide up to 60% FiO2); Venturi mask (up to 15 LPM and provide 50% FiO2); Partial rebreather mask (15 LPM and provide 70% FiO2); Non rebreather mask (15 LPM and provide 100% FiO2)

2- **High flow delivery device:**
High Flow Nasal cannula (HFNC): up to 70 LPM and provide 100% FiO2
Advantages: Well tolerated, generate PEEP (1 PEEP for every 10L)

3- **Non-invasive positive pressure ventilation**:
CPAP: (Setting 5-20 cmH2O) and used for type I respiratory failure;
BiPAP (Setting EPAP 4-16 cm H2O, IPAP 10-20 cmH2O and minimum pressure support 4 cmH2O) and used for both type I and type II respiratory failure.
    Increase CPAP or EPAP for hypoxia
    Increase pressure support (IPAP-EPAP) for hypercapnia

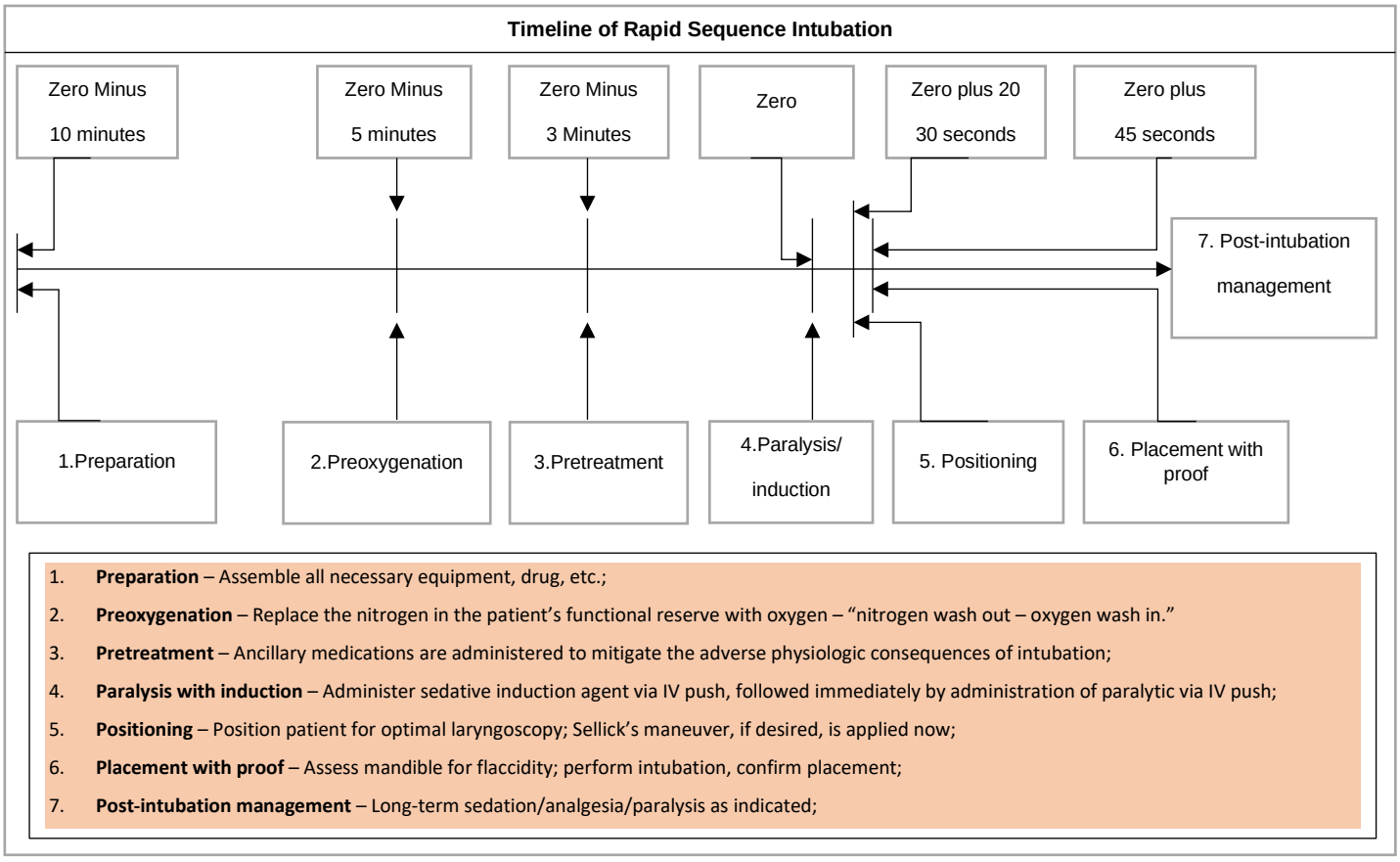
4- **Mechanical ventilation**.

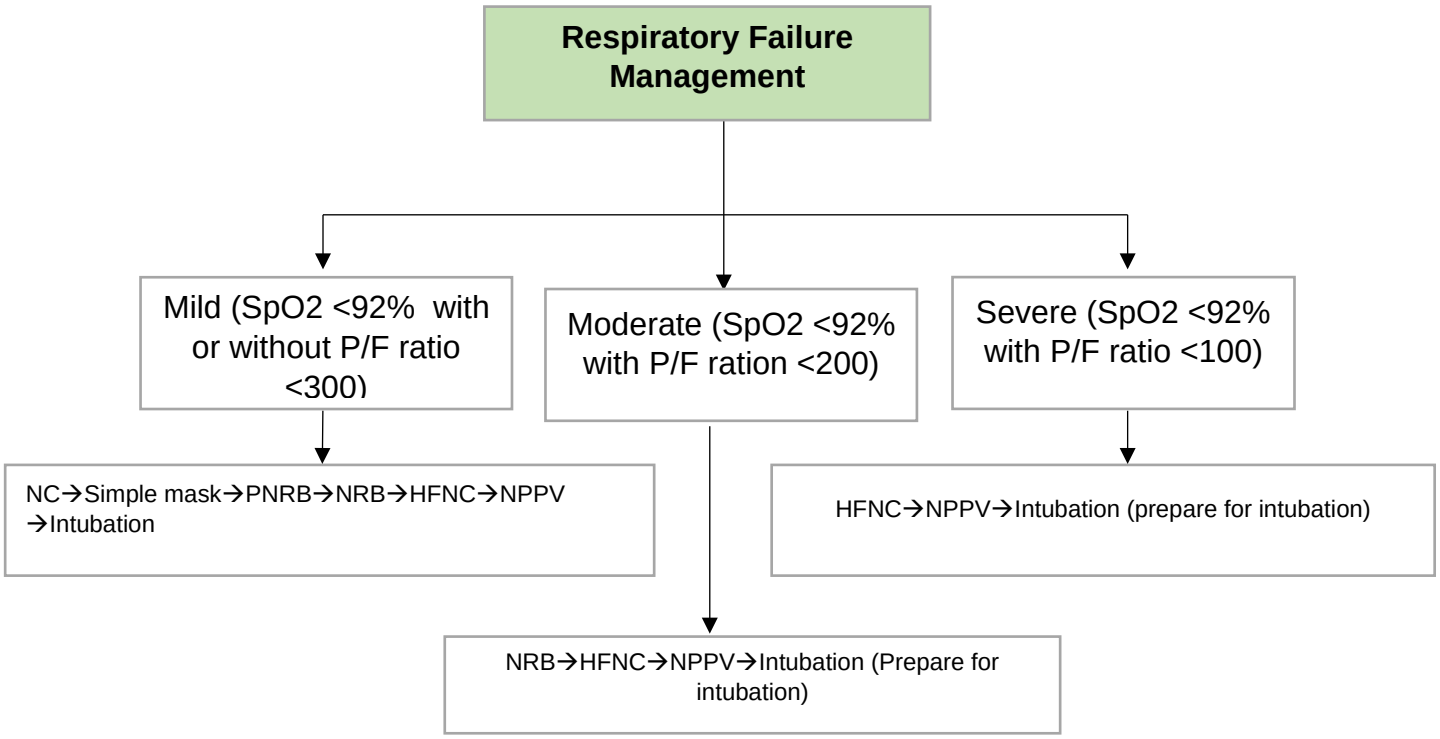
5- **Pulmonary vasodilator:** Nitric oxide is a lipophilic gaseous molecule that readily diffuses across pulmonary membranes, causing localized vasodilatory effects in the pulmonary vascular bed. It is used to combat vasoconstriction, V/Q mismatching, arterial hypoxemia, and pulmonary

hypertension associated with ARDS. NO improves oxygenation but doesn't have any effect on mortality.

6- **ECMO**

INTUBATION PROTOCOL	EXTUBATION PROTOCOL
• It's an aerosol generating procedure • Use negative pressure or single room • Use proper PPE including face shield/goggles, N95 or KN95 • Bed-up-head -elevated position • Avoid bagging • Use exhalation HME filter if bagging required • Adequate preoxygenation with NRB • Have vasopressors prepared prior to induction Rapid sequence intubation (RSI) using adequate sedation and neuromuscular blockade. • Video laryngoscopy over direct laryngoscopy • Post-intubation and ventilation should only be initiated once ETT cuff is inflated.	• It's an aerosol generating procedure • Use negative pressure or single room • Use proper PPE including face shield/goggles, N95 or KN95 • Bed-up-head -elevated position • Avoid bagging • Use exhalation HME filter if bagging required • Adequate preoxygenation with NRB • Have vasopressors prepared prior to induction Rapid sequence intubation (RSI) using adequate sedation and neuromuscular blockade. • Video laryngoscopy over direct laryngoscopy • Post-intubation and ventilation should only be initiated once ETT cuff is inflated.





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In USA HFNC is preferred over NRB if patient require NC>6 LPM. HFNC is not widely available in Bangladesh;

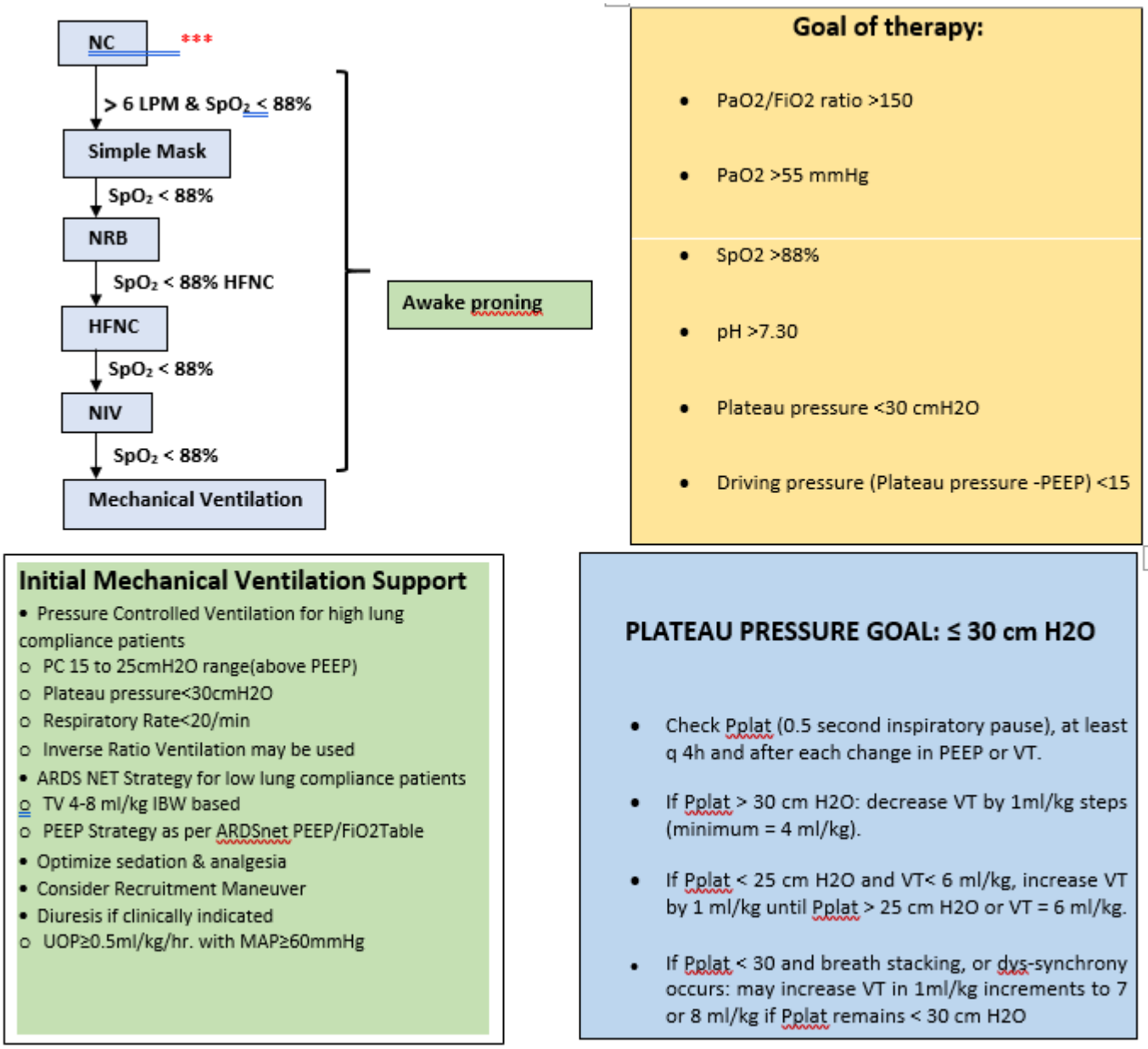
Awake Proning:
While proning has been used with good result in patient with ARDS but recent anecdotal reports showed benefit in non-intubated patient. A CARP (COVID Awake Repositioning/Proning Protocol) has been suggested.
Early intubation:
There is no evidence that early intubation instead of HFNC or NIV improves outcome. Data from China, Italy and USA showed higher mortality rate in intubated patient.

Aerosol Generating Procedures (AGPs)

- Intubation
- Extubation
- Bronchoscopy
- Nebulizer
- NIV
- Open Suction
- Tracheostomy
- CPR

Resources:

Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. Can J Anesth. https://doi.org/10.1007/s12630-020-01591-x



In USA HFNC is preferred if patient require NC>6 LPM. HFNC is not widely available in Bangladesh;
NIV should be used in negative pressure or single room.

RECOMMENDED INDUCTION AGENTS AND DOSING:

MED	DOSE	RANGE
Propofol	1.5 mg/kg	1-2 mg/kg
Ketamine	2 mg/kg	1-2 mg/kg
Midazolam	0.3 mg/kg	0.2-0.3 mg/kg
Fentanyl	4 mcg/kg	2-5 mcg/kg
Etomidate	0.3 mg/kg	0.2-0.6 mg/kg
Succinylcholine	1 mg/kg	1-2 mg/kg
Rocuronium	1 mg/kg	1-2 mg/kg

RECOMMENDED LABS:

On admission: COVID-19 testing; CBC with differential; LFT; Urea; Creatinine; CRP; D-dimer; PT; PTT; Fibrinogen; Ferritin; LDH; Troponin and BNP.

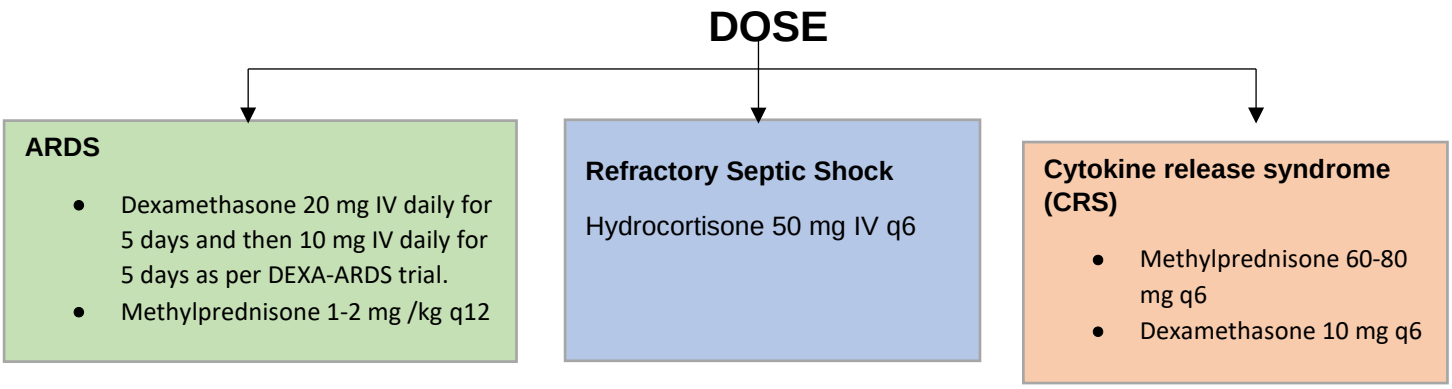
Every 72 hours: CBC with differentials, CRP, D-dimer, Urea, Creatinine, LFT and Troponin.

Daily lab as needed.

MEDICATION THERAPIES and SUPPORTIVE CARE IN ICU:

STEROID:

1. Systemic steroids should in general be **AVOIDED.**
2. SCCM and ESICM recommend steroid in ARDS.
3. SCCM and ESICM recommend steroid in severe pneumonia.
4. Surviving sepsis campaign recommend steroid in septic shock.
5. ADRENAL trial in 2018 showed decrease ventilator and ICU day with steroid but no mortality benefit.
6. APPROCCHSS in 2018 trial showed mortality benefit.
7. DEXA-ARDS trial showed (P/F ratio <200) showed mortality benefit.
8. Small Chinese retrospective non RCT trials in COVID-19 patient showed decrease ventilator day and mortality benefit.



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6400118/
Am J Respir Crit Care Med. 2017 May 1;195(9):1253-1263
Surviving Sepsis Campaign: Guidelines on the Management of Critically Ill Adults with Coronavirus Disease 2019 (COVID-19)
https://clinicaltrials.gov/ct2/show/NCT01731795
J Infect. April 2020. doi:10.1016/j.jinf.2020.03.039
JAMA Intern Med. March 2020. doi:10.1001/jamainternmed.2020.0994

TOCILIZUMAB: (Based on available data, the evidence for benefit is weak)

1. COVID-19 positive
2. All of the following respiratory findings:
   a. Abnormal chest imaging consistent with COVID-19

b. Rapidly worsening gas exchange/respiratory status over 24-48 hours and requiring >6 L/min O2

3. Absence of systemic bacterial or fungal co-infection
4. High clinical suspicion for cytokine release syndrome supported by elevated inflammatory markers (e.g., ferritin >600 ug/mL; D-dimer >1.0 mg/L) and clinical declines
5. On mechanical ventilation.

Dose:

- Adult Dosing (≥18 years): 8 mg/kg (max: 800 mg/dose)
- Pediatric Dosing (<18 years): Wt <30 kg—12 mg/kg; Wt >30 kg—8 mg/kg (Max: 800 mg/dose)
  Duration: 1 dose; Can repeat in 12 hours if no clinical improvement. Max 2 doses.

Resource:
http://www.med.umich.edu/asp/pdf/adult_guidelines/COVID-19-treatment.pdf

CONVALESCENT PLASMA: (Must meet all criteria):

1. Age >18 years old
2. Positive SARS-CoV-2
3. Admitted in ICU
4. Informed consent
5. Severe or life threatening disease defined by at least on eof the following:
   a) Increasing dyspnea
   b) Respiratory rate >30
   c) SpO2 <88%
   d) P/F ratio <300
   e) Lung infiltrate >50% withing 24-48 hours
   f) Septic shock
   g) Multi organ failure

Resource:
https://team.myiuhealth.org/COVID-19

HEMATOLOGY ISSUES:

1. Recommendations:
   a) All patient should have baseline CBC, D-dimer, Fibrinogen, PT, PTT, Ferritin, CPK, LDH
   b) Daily D-dimer if baseline or subsequent level >1000 ng/ml
   c) Consider daily CBC, PT, PTT and fibrinogen for ICU patient
   d) If CrCL >30 ml/min—use enoxaparin 40 mg SC daily
   e) If CrCL <30 ml/min—Use UFH (heparin)
   f) If BMI >40, use enoxaparin 40 mg SC BID
   g) If anticoagulation is contraindicated, use mechanical device.
   h) Confirmed DVT/PE—prefer enoxaparin over UFH (heparin)
   i) Suspected DVT/PE like worsening oxygenation, swollen leg or markedly increase D-dimer from baseline and unable to do imaging, advice full dose anticoagulation.

Resource:
https://www.massgeneral.org/assets/MGH/pdf/news/coronavirus/mass-general-COVID-19-treatment-guidance.pdf

EMPERIC ANTIBIOTICS: Consider strongly as per local antibiogram.

In patients with COVID-19 and hypoxic respiratory failure requiring mechanical ventilation, superinfection is reasonably common in this population. 15% of hospitalized COVID-19 patients developed a secondary bacterial infection and the median time to secondary bacterial infection was 17 days (13 to 19 days). Of all COVID-19 patients in their cohort, 79% had a low WBC.

Resource:
https://www.sccm.org/getattachment/Disaster/SSC-COVID19-Critical-Care-Guidelines.pdf

SEDATION:

1. Target RASS 0 to -2
2. Target RASS -3 or -4 if continuous NMBA is needed.
3. Fentanyl is the first choice (address pain and sedation).
4. Not routinely utilizing ketamine infusions over other agents such as propofol or midazolam.
5. Dexmedetomidine shouldn't be used as first agent.
6. Propofol and hypertriglyceridemia: Increased risk due to probable HLH-type syndrome monitor CK, acidosis, and early checking of triglycerides.

Resources:
SCCM PADIS Guidelines 2018
https://journals.lww.com/ccmjournal/Fulltext/2018/09000/Clinical_Practice_Guidelines_for_the_Prevention.29.aspx

NEUROMUSCULAR BLOCKADE:

1. Considerations for NMBA
2. Consider intermittent boluses first and assess for efficacy
3. If continuous infusion is needed due to persistent Dyssynchrony or profound hypoxia
4. Monitor train of four (TOF) to assist in titrating to lowest effective dose
5. Complications of NMBA:

    a) Corneal abrasion and the need of lubricating eye ointment

    b) Prolonged weakness

    c) Higher incidence thrombosis and the need for DVT prophylaxis

Resource:
Surviving Sepsis Campaign: Guidelines on the Management of Critically Ill Adults

with Coronavirus Disease 2019 https://www.esicm.org/wp-content/uploads/2020/03/SSC-COVID19-GUIDELINES.pdf

HEMODYNAMIC SUPPORT:

1. Target MAP>60, instead of >65.
2. Consider balanced crystalloid fluid (Ringer lactate, Hartmann's) over normal saline (higher incidence of AKI) and colloid.
3. Fluid sparing strategies and dynamic measures like PLR, Lactate, capillary refilling time to assess fluid status/responsiveness.
4. Conservative over liberal fluid strategy.
5. Norepinephrine as the first-line vasoactive agent, over other agents.
6. If norepinephrine is not available, either vasopressin or epinephrine as the first-line vasoactive agent, over other vasoactive agents.
7. Vasopressin as a second-line agent over increasing norepinephrine.
8. If there is evidence of cardiac dysfunction and persistent hypoperfusion despite fluid resuscitation and norepinephrine, add dobutamine, over increasing norepinephrine dose.
9. Refractory shock, add low-dose corticosteroid therapy ("shock-reversal"), over no corticosteroid therapy (IV Hydrocortisone 50 mg q6).

Resource:
https://www.sccm.org/getattachment/Disaster/SSC-COVID19-Critical-Care-Guidelines.pdf

FEEDING STRATEGIES (Nutrition):

1. Early enteral feeding within 24-48 hours is helpful.
2. Starting feeds at 25-50% caloric goal and increasing to 100% over 3-7 days is reasonable.
3. Use trophic or trickle diet (10-20 cc/hour) in hemodynamically or respiratory unstable patient
4. Don't check gastric residual volumes (GRVs) routinely.
6. Consider post pyloric tube placement or prokinetics in a patient with high GRVs or vomiting.
7. Avoid post pyloric feeding in unstable patient (higher incidence of non-occlusive bowel necrosis)

Resources:
Surviving Sepsis Campaign: Guidelines on the Management of Critically Il Adults with Coronavirus Disease 2019 https://www.esicm.org/wp-content/uploads/2020/03/SSC-COVID19-GUIDELINES.pdf
2019 ESPEN guidelines and 2016 SCCM/ASPEN guidelines

BLOOD GLUCOSE (BG):

1. Target BG 140-180 mg/dl (8-10 mmol/l).
2. Use sliding scale initially but change to drip if requiring higher insulin or BG is not well controlled.

VITAMIN C, THIAMINE and VIT B12:

Recent studies (CITRIS-ALI and VITAMINE trial) showed vitamin C did not significantly improve organ dysfunction scores or alter markers of inflammation and vascular injury. IV Vitamin C can give falsely high finger prick glucose level and may lead to overuse of insulin which may in turn can cause hypoglycemic episode. **Not recommended.**

Resources:

JAMA. 2019;322(13):1261-1270. doi:10.1001/jama.2019.11825
JAMA. 2020;323(5):423-431. doi:10.1001/jama.2019.22176

6. Recovery Trial

Dr Sarkar Haider

There are currently no approved anti-viral or host-directed treatments for COVID -19. Several possible treatment options have been evaluated. UK hospitals are participating in RECOVERY (Randomised Evaluation of Covid-19 Therapy) trial. Following are the medications with trial protocol (doses not given as not recommended for clinical use at present).

Eligibility

Patients are eligible for the study if all of the following are true:

(i) Aged at least 18 years

(ii) Hospitalised

(iii) SARS-CoV-2 infection (clinically suspected or laboratory confirmed)

(iv) No medical history that might, in the opinion of the attending clinician, put the patient at significant risk if he/she were to participate in the trial.

1. **Lopinavir -Ritonavir**
2. **Hydroxychloroquine**
3. **Azithromycin**
4. **Corticosteroid:**
5. **Tocilizumab (an anti-inflammatory treatment given by injection)**

Placebo arm: No Additional Treatment as there are currently no approved anti-viral or host directed treatments for COVID-19.

The patients are randomised in a ratio of 2:1 between the placebo arm (no additional treatment) and each of the other arms.

Second randomisation for patients with progressive COVID-19 and extensive lesions in the lungs: Immunotherapy

Tocilizumab by intravenous infusion

Centers: More than 130 NHS hospitals

Outcomes: Death/discharge/need for ventilation/need for renal replacement therapy

Funding: UK research and innovation (UKRI) and department of health and social care thorough University of Oxford.

Treatment of COVID Pneumonia patient is predominantly supportive with hydration, maintaining Oxygen saturation and treating Co-infection.

Choice of antibiotics completely depend on local sensitivity and guidelines.

The above mentioned drugs should not be used outside a clinical trial.

Reference: https://www.recoverytrial.net/

7. Lack of evidence for any specific pharmacological treatment for COVID-19

Dr Sarah Choudhury, Dr Zahed Ikram

Few Published Case Series

Table 2. Summary of Treatment and Clinical Outcomes From Early COVID-19 Clinical Series

Source	Huang et al, 2020[91]	Chen et al, 2020[92]	Wang et al, 2020[51]	Yang et al, 2020[93]	Young et al, 2020[94]	Kujawski et al, 2020[66]	Guan et al, 2020[95]
Study setting and region	Wuhan Jinyintan Hospital, China (12/16/19-1/2/20)	Wuhan Jinyintan Hospital, China (1/1/20-1/20/20)	Zhongnan Hospital, Wuhan, China (1/1/20-1/28/20)	Wuhan Jinyintan Hospital, China (12/24/19-1/26/20)	4 Singapore hospitals (1/23/20-2/3/20)	US-confirmed cases (1/20/20-2/5/20)	National Chinese cases (12/19/19-1/29/20)
No. of patients	41 Hospitalized	99 Hospitalized	138 Hospitalized	52 (All ICU)	18 Hospitalized	12 (Only 7 hospitalized)	1096 Hospitalized
Age, median (IQR), y	49 (41-58)	Mean (SD), 55.5 (13.1)	56 (42-68)	Mean (SD), 59.7 (13.3)	47 (31-73)	53 (21-68)	47 (35-58)
Sex, No. (%)							
Male	30 (73)	67 (68)	75 (54)	35 (67)	9 (50)	8 (67)	637 (58)
Female	11 (27)	32 (32)	63 (46)	17 (33)	9 (50)	4 (33)	459 (42)
ICU status/ complications, No. (%)	ICU: 13 (32); ARDS: 12 (29); MI: 5 (12); AKI: 3 (7); shock: 3 (7); secondary infection: 4 (10)	ICU: 23 (23); ARDS: 17 (17); AKI: 3 (3); shock: 4 (4); VAP: 1 (1)	ICU: 36 (26); ARDS: 27 (20); MI: 10 (7.2); arrhythmia: 23 (17); AKI: 5 (3.6); shock: 12 (8.7)	ICU: 52 (100); ARDS: 35 (67); MI: 12 (23); AKI: 15 (29); bacterial infection: 8 (15)	ICU: 2 (11); ARDS: 0 (0); secondary bacterial infection: (0)	ICU: 1 (8); culture-positive secondary bacterial infection: 0 (0)	ICU: 55 (5); ARDS: 37 (3.4); AKI: 6 (0.5); shock: 12 (1.1)
Treatments, No. (%)							
Supportive care	NIV/HFNC: 10 (24); MV: 2 (5); ECMO: 2 (5); KRT: 3 (7)	NIV: 13 (13); MV: 4 (4); ECMO: 3 (3); KRT: 9 (9)	NIV: 15 (10.9); MV: 17 (12); ECMO: 4 (2.9); KRT: 2 (1.5)	NIV: 29 (56); MV: 22 (42); ECMO: 6 (12); KRT: 9 (17)	Supplemental oxygen: 6 (33); MV: 1(6)	Supplemental oxygen: 4 (33)	Oxygen: 454 (41); NIV: 56 (5); MV: 25 (2); ECMO: 5 (0.5); KRT: 9 (0.8)
Specific agents	Antivirals (oseltamivir): 38 (99); antibacterials: 41 (100); corticosteroids: 9 (22)	Antivirals (oseltamivir, ganciclovir, or lopinavir/ ritonavir): 75 (76); antibacterials: 70 (71); antifungals: 15 (15); corticosteroids: 19 (19); IVIG: 27 (27)	Antivirals (oseltamivir): 124 (90); antibacterials: moxifloxacin: 89 (64), ceftriaxone: 34 (23), azithromycin: 25 (18); corticosteroids: 62 (45)	Antivirals: 23 (44); antibacterials: 49 (94); corticosteroids: 30 (58); IVIG: 28 (54)	Antivirals (lopinavir/ ritonavir): 5 (42); other antivirals or antibacterials: NR	Antivirals (remdesivir): 3 (25); antibacterials: 5 (42); corticosteroids: 2 (17)	Antivirals (oseltamivir): 393 (36); antibacterials: 637 (58); antifungals: 31 (2.8); corticosteroids: 204 (19); IVIG: 144 (13)
Discharged alive, No. (%)	28 (68)	31 (31)	47 (34)	NR	8 (75)	100 (100)	55 (5)
Deaths, No. (%)	6 (15)	11 (11)	6 (4.3)	32 (62)	0	0	15 (1.4)

James et al *JAMA*. doi:10.1001/jama.2020.6019

Lack of evidence for any specific pharmacological treatment for COVID 19-

No proven effective therapy for this virus has been found to date. Below we go through some of the common drugs that are being used in various trials-

Hydroxychloroquine-

1.News briefing from China reported chloroquine was successfully used to treat a series of over 100 COVID-19 cases- claimed improved radiologic findings, enhanced viral clearance and reduce disease progression (1)
Validity of these claims are doubtful as clinical trial design and outcome data not presented or published for peer review.

2.A French study carried out with a very small sample size (36) and six patients receiving hydroxychloroquine and azithromycin, several patients had to be removed due to early recession of treatment resulting from critical illness or intolerance of medications (2) so not enough evidence to prove any benefit.

3.China-prospective study of 30 patients randomised to hydroxychloroquine plus standard of care (supportive care, interferon and other antivirals) or standard care alone-no difference in virologic outcome (3)

4. FDA have reviewed case reports in the FDA Adverse Event Reporting System database, the published medical literature, and the American Association of Poison Control Centers National Poison Data System concerning serious heart-related adverse events and death in patients with COVID-19 receiving hydroxychloroquine and chloroquine, either alone or combined with azithromycin or other QT prolonging medicines. Adverse events were reported from the hospital and outpatient settings for treating or preventing COVID-19, and included QT interval prolongation, ventricular tachycardia and ventricular fibrillation, and in some cases death. FDA was continuing to investigate these safety risks in patients with COVID-19 and will communicate publicly when more information is available(13).

Lopinavir/Ritonavir and other retrovirals-

Early reports of above for treatment of COVID-19, mostly case reports and small retrospective, non-randomised cohort studies.
Cao and Colleagues (4)-Open labelled RCT, in 199 patients comparing Lopinavir-Ritonavir with standard care. This showed no difference in time to improvement or difference in viral clearance or 28 day mortality(12).

Ribavirin-

Inconclusive data and produces significant dose dependant haematologic toxicity (5)

Oseltamivir-

No role in management of COVID-19 (12). It has been found to be useful only for influenza.

Favipiravir (Avigan)-

This is being manufactured in Bangladesh.
Influenza drug currently in phase III trial in Japan and USA. Previous trial in China was inconclusive due to poor trial design. Results expected in July (14).

Umifenovir-

A non-randomised study in China on 67 patients showed lower mortality and higher discharge rates, now ngoing RCTs in China to evaluate this (6).

Interferon alpha and beta-

No animal or human data exist to recommend use for COVID-19, and it remains to be seen whether they confer protection for patients already taking them for other indications (12).

Remdesivir-

This might be a promising potential therapy against COVID-19. Trials are ongoing to evaluate the safety and antiviral activity of remdesivir in patients with mild to moderate or severe COVID-19. Of particular importance, the National Institutes of Health is sponsoring Randomized, double-blind, placebo- controlled trial that will shed light on the effectiveness of remdesivir (7). A news release from NIH suggested that the ACTT trial showed accelerated recovery from advanced Covid-19 with Remdesevir, but details and peer review are awaited. On the 1st of May FDA has approved the use of Remdesivir following the results of a trial. It should be used for hospitalised severely ill patients or within the merits of a clinical trial.

Adjunctive therapies-
Corticosteroids-

Observational studies in patients with SARS and MERS reported no associations of corticosteroids with improved survival but demonstrated an association with delayed viral clearance from the respiratory tract and blood and high rates of complications including hyperglycaemia, psychosis and avascular necrosis (9,10). It is more useful in secondary bacterial infection rather than viral pneumonia (13).

The potential harms and lack of proven benefit for corticosteroids cautions against their routine use in patients with COVID-19 outside an RCT unless a concomitant compelling indication, such as chronic obstructive pulmonary disease exacerbation or refractory shock exists.

Anti-cytokine or Immunomodulatory agents-

The underlying pathophysiology of significant organ damage in the lungs and other organs is caused by an amplified immune response and cytokine release, or "cytokine storm."(11)Tocilizumab, a monoclonal antibody IL-6 receptor antagonist, is FDA approved to treat RA and cytokine re- lease syndrome following chimeric antigen receptor T-cell therapy. Given this experience, tocilizumab has been used in small series of severe COVID-19 cases with early reports of success (13).

Sarilumab (Kevzara) must also be mentioned as along with tocilizumab, it is in a trial now in critically ill Covid19 patients (17).

Immunoglobulin Therapy-

Another potential adjunctive therapy for COVID-19 is the use of convalescent plasma or hyperimmune immunoglobulins. The rational being that antibodies from recovered patients may help with both free virus and infected cell immune clearance (82). However, as a significant proportion of patients recover from COVID-19, a safety and efficacy trial needs to be done (13).The evidence for this is limited to 3 patients. Trial is currently underway (16).

Conclusion:

As Covid19 is a new disease and most patients make a full recovery, use of experimental drugs outside of trials is not recommended. The likelihood is that unless administered within strict trial protocols, these drugs will harm some patients. Anecdotal evidence in this situation is not useful as most of these patients recover with supportive treatment or with no intervention.

References-

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8. Thromboprophylaxis and management of coagulopathy in COVID-19

Dr Mehedi Hasan

1. Introduction:

COVID-19 is a systemic infection caused by a novel coronavirus (SARS-CoV-2), with a significant impact on the hematopoietic system and haemostasis.

Current evidence suggests that patients affected by this novel coronavirus are more prone to venous thromboembolism (VTE), mainly due to hypoxia, systemic inflammatory response and prolonged immobilization. Intensive care procedures, such as mechanical ventilation or central venous cannulation, increase VTE risk further.
Several coagulation abnormalities have been described so far in these patients, including elevated D-dimer, prolonged prothrombin time (PT), activated partial thromboplastin time (aPTT) and increase in fibrin degradation products (FDP). Furthermore, some patients may develop life-threatening complications, such as disseminated intravascular coagulation (DIC), which necessitates continuous vigilance and prompt intervention.
Higher D-Dimer levels in COVID-19 patients are associated with worse prognosis, higher risk of Adult Respiratory Distress Syndrome (ARDS) and increased chance of admission to intensive care.

2. VTE Prophylaxis:

All patients admitted to hospital with confirmed or suspected COVID-19 should at least have the following tests:

- Full blood count (FBC)
- Urea & electrolytes
- LFTs
- Coagulation screening
- D-dimer

All patients should be monitored closely for bleeding complications, as well as heparin-induced thrombocytopenia.

3. DOSE:

a) If CrCL >30 ml/min— enoxaparin 40 mg SC daily
b) If CrCL <30 ml/min— enoxaparin 20 mg OD SC
c) If BMI >40, use enoxaparin 40 mg SC BID
d) If anticoagulation is contraindicated, use mechanical device.
e) Confirmed DVT/PE— enoxaparin (1.5 mg/kg body weight)
f) Suspected DVT/PE like worsening oxygenation, swollen leg or markedly increase D-dimer from baseline and unable to do imaging, advice full dose anticoagulation with enoxaparin/direct oral anticoagulants (apixaban/rivaroxaban/edoxaban/dabigatran)

4. Extended thromboprophylaxis on discharge

Clinicians should consider extended thromboprophylaxis for up to 4 weeks from the date of discharge with LMWH/DOAC (i.e. apixaban 2.5mg twice daily or rivaroxaban 10mg daily) on the basis of individual risk/benefit assessment (e.g critical care stay, reduced mobility, previous VTE) and D-Dimer levels (i.e >1000).

1. Management of patients on oral anti-coagulation on admission:

Patients admitted on warfarin or treatment dose DOAC, should be converted to a treatment dose of dalteparin according to their weight and renal function.

2. Coagulopathy management:

A. Abnormal coagulation results do not require correction in patients who are not bleeding unless an interventional procedure is planned.

B. In patients with major bleeding stop any anticoagulation, give empirical Fresh frozen plasma (FFP) and red cells followed by blood products determined by repeat coagulation screens, using PT/INR >1.5 or APTT > 1.5 as an indication to give FFP 15-25mg/Kg. For fibrinogen <1g/l give cryoprecipitate or fibrinogen concentrate. If platelets <30x 10^9/L give a pool of platelets.

C. Management of disseminated intravascular coagulation (DIC) in COVID-19

DIC can occur in patients in intensive care which may lead to multi-organ failure.
It is uncertain whether COVID-19 has unique characteristics to cause DIC. It seems more plausible that DIC develops in patients with COVID-19 after they become hypoxic, and/or have secondary bacterial infection.

To aid diagnosis of DIC, it is recommended to use the International Society on Thrombosis and Haemostasis (ISTH) DIC score (Table 4).

Table: Society on Thrombosis and Haemostasis (ISTH) DIC score.

-	Score
Platelet Count	
>100 x 10^9/L	0
50-100 x 10^9/L	1
<50 x 10^9/L	2
D-dimer	
No increase	0
Moderate increase (1 – 10 times upper limit of normal)	2
Strong increase (> 10 times upper limit of normal)	3
Fibrinogen	
> 1.0 g/L	0
≤ 1.0 g/L	1
Prothrombin time prolongation	
< 3 s	0
3 – 6 s	1
> 6 s	2
Overt Disseminated Intravascular Coagulation	**≥ 5**

- A score < 5 means DIC is unlikely and the score should be recalculated every 1-2 days as necessary. The best management of DIC is to identify and treat the underlying condition.

- **Recovery from DIC is dependent on endogenous fibrinolysis breaking down the disseminated thrombi. This process will be inhibited by tranexamic acid which is an anti-fibrinolytic, hence tranexamic acid should not be used in COVID-associated DIC.**
- Manage bleeding with blood product replacement as per managing major bleeding as above i.e. if PT/INR or APTT ratios are greater than 1.5 then

give FFP 15-25mg/Kg; if fibrinogen is <1.5g/l then give a source of fibrinogen- either cryoprecipitate or fibrinogen concentrate. If platelet are < 30x 10^9/L then give platelets.

- o If overt thromboembolism or organ failure due to clot (i.e. purpura fulminans) consider low dose anticoagulation with unfractionated heparin pump to switch off stimulus to coagulation activation. Be mindful that there has been no mortality benefit of therapeutic anticoagulation and so run aPTT target < 1.5 or anti-Xa levels 0.6-1.0 in DIC. (Levi et al., Blood, 2018)

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9. The role of chest imaging in COVID-19 patients

Dr Tasbirul Islam

KEY POINTS:

***** CXR or CT scan shouldn't be used to diagnose COVID-19. Viral testing (RT-PCR) remains the only specific method of diagnosis.

***** Normal CXR or CT scan doesn't exclude COVID-19 (up to 50% patients with COVID-19 may have normal CT scans, especially on day 0-2 of commencement of the disease).

***** Imaging is not indicated in asymptomatic or mild cases.

***** Generally, the findings on chest imaging in COVID-19 are not specific, and overlap with other infections.

***** CXR is insensitive in mild or early COVID-19 infection. Chest-films can be useful in the follow-up of the disease.

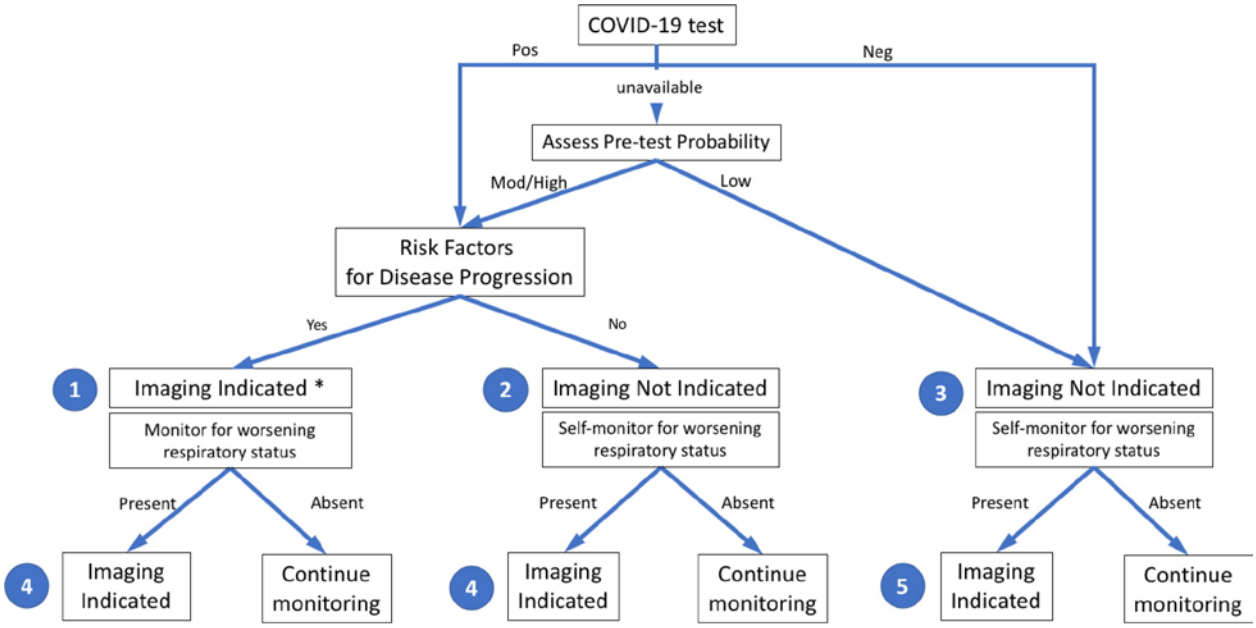
***** CT is more sensitive for early parenchymal lung disease, disease progression, and alternative diagnoses including acute heart failure from COVID-19 myocardial injury.

***** CT is indicated in patients with functional impairment, hypoxemia, or both, after COVID-19 recovery.

***** COVID-19 testing is warranted in patients incidentally found to have findings suggestive of COVID-19 on a CT scan.

***** Daily CXR's are not indicated in stable intubated patient.

*** The choice of imaging modality is left to the judgement of clinical teams at the point-of-care accounting for the differing attributes of CXR and CT, local resources, and expertise.**

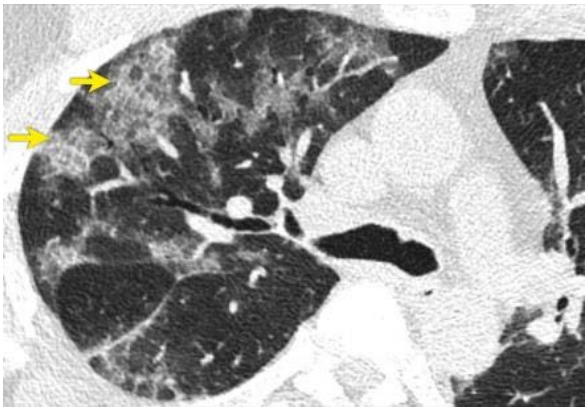


* Clinical judgement should dictate the use of imaging through consideration of patient risk factors and local resources.

CT chest patterns in COVID-19 patient:

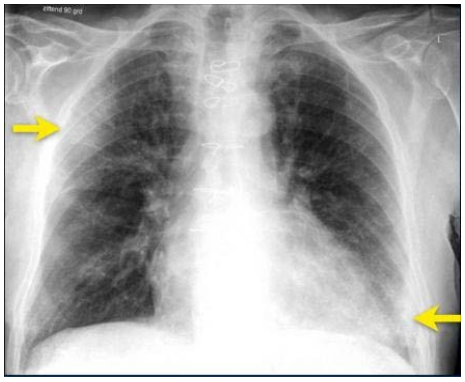
- Multifocal, bilateral, peripheral ground glass pattern (GGO) is the most common findings.
- Sometimes crazy paving pattern (thickened interlobular and intralobular lines in combination with a ground glass pattern) found in later stage of the disease.
    - GGO pattern: 88%
    - Bilateral involvement: 88%
    - Posterior distribution: 80%
    - Multilobar involvement: 79%
    - Peripheral distribution: 76%
    - Consolidation: 32%

GGO pattern

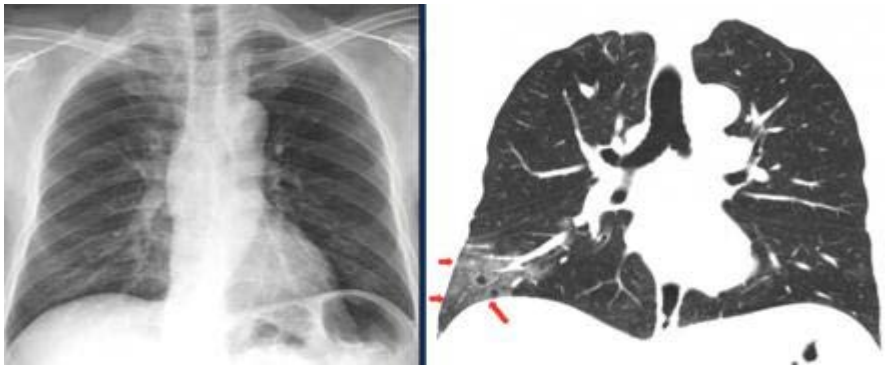


Crazy Paving pattern

CXR patterns in COVID-19 patient:



CXR is insensitive in early stage:



CXR **CT chest**

Ultrasound chest imaging of COVID-19 patients is not included as it is not widely available and lack of direct experience in Bangladesh.

Image sources: https://radiologyassistant.nl/chest/lk-jg-1

•Renal Drug database. http://renaldrugdatabase.com. Accessed 23.4.20

10. Infection Control

Dr. Muhammad S. Tabriz

Introduction:

Infection prevention and control (IPC) is one of the most important aspects for any healthcare facility to ensure the safety of patients, healthcare personnel, and the environment. Every healthcare facility must establish its own infection control protocols for safe operation of all aspects of healthcare delivery. Such protocols need periodic review and updates based on any new outbreaks and available resources in order to remain effective.

An effective infection control program requires multidisciplinary approach, participation, commitment and coordination among different departments- administration, engineering, environmental services (cleaning, disinfection and waste disposal), Infectious disease specialists, microbiologists, and in some cases local and governmental agencies.

Hospitals and healthcare facilities in Bangladesh must take into consideration other variables such as building structure, single room vs. ward, ventilation, use of air conditioning, fan etc.

Infection Control Basics

Sources of Infection

Person

- People, including:
    - Patients
    - Healthcare workers
    - Visitors/household members
    - Community members
- ***Hands are the most common source for spreading infection***

Environment

- Dry surfaces in patient care areas (ie. bed rails, medical equipment, countertops, tables, etc.)
- Wet surfaces, moist environments, and biofilms (ie. faucets and sinks, equipment such as ventilators)
- Indwelling medical devices (ie. catheters and IV lines)
- Dust or decaying debris (ie. construction dust or wet substances from water leaks)
- For environmental cleaning and disinfection establish a protocol and checklist and verify compliance.
- Identify and take extra caution for “HIgh touch surface”- bed rails, table top, IV pole, chair, sink, light switch, door knobs, toilet seat, flush handle etc. Clean these surfaces frequently.

Infection control precaution can be broadly divided into two parts:

1. Standard precautions: applies to all patient care
2. Transmission-based precautions: based on organisms and their mode of transmission

Standard Precautions

- Assume that every person is potentially infected or colonized with a pathogen that could be transmitted in the healthcare setting
- Should be used for all patient care at all times
- ***Hand hygiene*** before and after each patient encounter
- Gown, gloves, and eye protection as needed
    - e.g. If any contact with bodily secretions is anticipated, gloves/gowns should be used. Similarly, if any splash of secretions is anticipated, use eye protection
    - Use of gloves does not replace hand hygiene
- Safe disposal and cleaning of instruments/linens per protocol
- Proper cough etiquette

Hand Hygiene:

Hand hygiene is **the single most** important component of infection control measures.

"My five moments of hand hygiene" from the WHO initiative for clean hands[1]:

1. Before touching a patient
2. Before clean/aseptic procedures
3. After bodily fluid exposure/risk
4. After touching a patient
5. After touching patient surroundings

Proper hand hygiene should be performed for at least 20 seconds.

- Wash with soap and water:
    - When hands are visibly soiled
    - Infectious diarrhea *Clostridium difficile*, Norovirus
    - Before eating, after using the washroom
- Use alcohol-based hand sanitizer (minimum 60% alcohol):
    - When hands are not visibly soiled

Cough Etiquette

- Cough/sneeze into tissue - properly dispose of in waste basket
- Cough/sneeze into sleeve, not hands
- If sick, wear a mask
- Perform proper hand hygiene after coughing/sneezing into tissue or sleeve

Transmission-based Precautions

Contact Precaution:

- Follow Standard precaution, plus gloves/gowns at all times in patient rooms
    - Gloves/gowns should be removed **before** leaving patient room
    - Gloves/gowns should not be reused between visiting multiple patients
- Use dedicated noncritical items (ie. stethoscope, thermometer, BP machine, etc.) for a single patient
    - If unable to do so, then disinfect each item properly after each use
- A few examples of infection/organism where contact isolation is needed:
    - MRSA, MDRO, CRE
    - Enteric infections *Clostridium difficile*, Norovirus

Droplet Precaution:

Droplets are respiratory secretions ≳ 5 microns

- Transmission occurs within 3-6 ft. of source through coughing, sneezing, talking
- Wear a surgical mask at all times in patient room/area
    - Remove upon exiting the room
- Pathogen examples:
    - N. meningitidis, Bordetella pertussis, Mycoplasma pneumoniae
    - Influenza, parainfluenza, adenovirus, rubella

Airborne Precaution:

Airborne droplets nuclei are respiratory secretion particles <5 microns and remain suspended in the air for longer time/distance

- Private patient rooms with negative air pressure, 6-10 air change/hour
    - Uses High Efficiency Particulate Air (HEPA) filter
- Wear respirator, N-95 mask, Powered Air Purifying Respirator (PAPR)
    - All healthcare personnel will have to be trained and fit-tested to be able to use respirator
- Pathogen examples:
    - Tuberculosis, viruses- Varicella, measles, smallpox

Combining more than one precaution:

- Contact and droplet
    - MRSA pneumonia, Metapneumovirus, RSV

  Contact and airborne:

    - Varicella (Chicken Pox), Disseminated Zoster

Infection Control Guidance for COVID-19

According to the CDC, the goal of infection prevention and control (IPC) activities in the coronavirus disease 2019 (COVID-19) response is to support the maintenance of essential healthcare services by preventing healthcare-associated transmission of SARS-CoV-2 among healthcare workers (HCW) and patients.[2]

This requires:

- Rapid identification of suspect cases
- Immediate isolation and referral for testing
- Safe clinical management
- Adherence to standard IPC precautions

A clear understanding of the mode of transmission of COVID-19 is important to implement interventions to control and prevent COVID-19 infection.

Mode of transmission[3,4]:

- **Primarily by droplets**: When the infected person speaks, coughs, or sneezes, respiratory droplets can enter the mouth, nose, or eyes of people who are nearby or even inhaled by people within close proximity (3-6 feet) of the infected individual.
- **Contact**: Indirect transmission may occur with contact via hand contaminated by infected person's hand or contaminated surfaces then subsequent self-contamination by touching the eyes, nose, or mouth.
- **Possible aerosols/airborne**: although less is known about transmission via aerosols or small respirable particles, aerosol generating procedures may play a role in transmitting infection. However, airborne transmission over long distances from person to person is unlikely.
    - Examples of aerosol generating procedures include: intubation, mechanical ventilation, non-invasive ventilation such as BiPAP and CPAP, manual ventilation, cardiopulmonary resuscitation, bronchoscopy, open suctioning of airways, and sputum induction.
    - Although there is limited data, the following procedures may also generate aerosols such as nebulizer administration and high flow oxygen delivery

Based on mode of transmission following infection control precaution are recommended for SARS-CoV2:

1. Place suspected patient under Investigation (PUI) or confirmed case of COVID-19 in contact and droplet isolation
2. Multiple confirmed cases can be cohorted in a single room/ward, however suspected cases need to be placed in single rooms until confirmed. If single rooms are not available, the patient's bed should be placed at least 1 meter apart in a well-ventilated room.[5]
3. Use a negative pressure room for aerosol generating procedures; if unavailable, use a well-ventilated single room

Strategies to prevent and control COVID-19 infection in healthcare facilities[4]

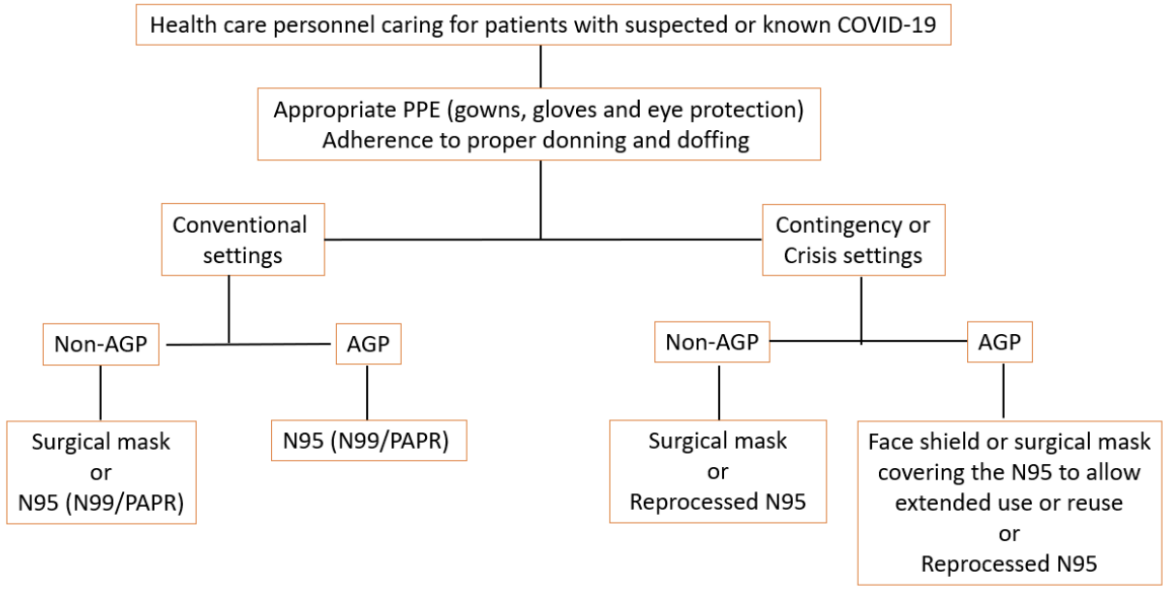
We can approach and implement the steps to minimize the risk of exposure and control infection at 3 different levels of intervention:

1. **The patient**:
    - Educate patients on hand hygiene and the importance of wearing face mask/cloth mask.
    - Based on recent findings it is possible for asymptomatic or pre-symptomatic patients to contribute to the transmission of COVID-19. Current recommendations for source control by symptomatic and asymptomatic individuals include wearing a cloth face covering or facemask. By wearing a facemask or face covering, respiratory secretions from the mouth and nose can be contained and prevent/reduce the spread of SARS CoV-2.

2. **The healthcare facility**:
    - Establishing triage protocols
    - Establishing separate units for COVID-19 suspected and confirmed cases
    - Providing adequate equipment and resources to practice infection prevention and control including adequate hand hygiene material and implementing environmental cleaning and disinfecting protocols, and providing appropriate personal protective equipment (PPE), as well as proper training to all HCW on how to use PPE.

3. **The healthcare worker**:
    - Healthcare workers are those in direct contact with patients as well as other ancillary personnel
    - Healthcare workers must be educated and trained on appropriate infection prevention and control basics and appropriate use of PPE based upon their level of interaction with patients.
    - It's important to practice hand hygiene frequently, refrain from touching the face, and avoid touching the front of the mask when wearing a medical mask/respirator

Figure 1. IDSA Algorithm for Appropriate PPE in Conventional and Contingency or Crisis Settings



AGP: aerosol-generating procedures; **PPE**: personal protective equipment

Personal protective equipment (PPE) for healthcare workers[4,7]:

- The Occupational Safety and Health Administration (OSHA) defines PPE as specialized clothing or equipment worn by an employee for protection against infectious materials.[6]
- Healthcare worker should be trained on proper donning (putting on) and doffing (removal) of PPE
- PPE for protection against COVID-19 include: gowns, gloves, masks and respirators, eye covers (i.e. goggles), or face shields
    - *Gowns*
        - It's recommended to use long-sleeved water-resistant gowns. If water-resistant gowns are unavailable, a single-use plastic apron can be worn over the non-water-resistant gown. Normal disposable isolation gowns as well as standard surgical gowns may also be used[8]
        - Reusable washable water-resistant cloth gowns may also be used if available
        - The use of boots, coverall, and apron is not required during routine care[5]
    - *Gloves*
        - Non-sterile disposable patient examination gloves used in the typical healthcare setting are recommended
        - Currently the CDC does not recommend double gloves when caring for COVID-19 patients
    - *Masks and respirators*
        - Surgical or medical face masks are used for droplet precaution

        - Respirators include N95, powered air purifying respirator (PAPR), filtering facepiece (FFP2 and FFP3) are used for airborne precautions
            - Proper training and appropriate fit testing program are required for the use of respirators
        - Recommendations for using surgical masks or N95 respirator:
            - For confirmed COVID-19 patients, the CDC recommendation prefers use of N95 respirators over surgical masks. However, surgical masks are also acceptable for use except during aerosol generating procedures.
            - The Infectious Disease Society of America (IDSA) published their recommendations for the use of masks as shown below. Contingency or crisis settings refer to situations where there are a shortage of masks or respirators such as this COVID-19 pandemic:[9]
    - *Eye covers (i.e. goggles*) *or face shields*
        - It is recommended to wear goggles to protect the eye mucosa. The face shield offers additional protection if the reuse of N95/FFP respirators are intended
    - *Head covers and shoe covering*
        - According to the IDSA there is insufficient data available to support the use of head covering and shoe covers when taking care of COVID-19 patients
        - The European Centre for Disease Control (ECDC) and WHO do not include the head coverings and shoe covers as recommended PPE for healthcare workers taking care of COVID-19 infected patients.
- Due to shortages as a result of the current COVID-19 pandemic, N95 respirators and eye shields may be worn in extended use or reused with appropriate precaution and protocols[10]
    - *Reuse*
        - When the N95 respirator and/or eye shield is removed in between patient encounters
        - There is no set number of reuses for N95 respirators, however up to 5 reuses are recommended
    - *Extended use*
        - When N95 and/or eye shield is used for multiple patients without removal between each patient care
        - Surgical masks may also be worn in extended use up to 6 hours as long as the outer surface of the mask is not touched by the healthcare worker
        - Extended use is preferred over reuse to minimize potential contamination during donning and doffing

Using PPE:[11]

Healthcare workers caring for infected patients should perform the following steps to wear PPE before entering the patient room:

1. Gather the appropriate PPE to wear
2. Perform hand hygiene with hand sanitizer
3. Put on isolation gown and make sure to tie all ties on the gown
4. Put on N95 mask or use a facemask if N95 mask is unavailable
    - Do NOT place N95 respirator or facemask under the chin or store in pockets
5. Put on face shield or goggles for full face coverage
6. Perform hand hygiene by washing hands
7. Put on gloves, making sure to cover the cuff/wrist of the gown

Healthcare workers should perform the following steps to remove PPE:

1. Remove gloves, making sure to avoid further contamination of the hands
2. Remove gown and dispose in appropriate bin
3. Exit patient room
4. Perform hand hygiene by washing hands appropriately
5. Remove face shield or goggles without touching the front of the face shield or goggles
6. Remove N95 respirator or facemask without touching the the front of the N95 respirator or facemask
7. Perform hand hygiene after removing N95 respirator/facemask
    - If required to reuse, perform hand hygiene before putting it on again

Estimated needs of PPE for COVID-19 in the healthcare facility:

It is a common misconception in Bangladesh that the number of PPE can be estimated based on the number of physicians or healthcare workers taking care of suspected or confirmed patients of COVID-19. However, the number of sets for PPE depends on the total number of suspected and confirmed cases of COVID-19. This is because PPE should be changed after each patient encounter. The exception is in cases where facemasks/N95 respirators and face shields/eye goggles are worn for extended use purposes in certain situations. The ECDC offers some guidance regarding how to estimate the number of sets of PPE needed per patient per day, as shown in the table below:[12]

Table 2. **Minimum number of sets for the different case scenarios**

	Suspected case	Confirmed case *Mild symptoms*	Confirmed case *Severe symptoms*
Healthcare staff	**Number of sets per case**	**Number of sets per day per patient**	
Nursing	1–2	6	6–12
Medical	1	2–3	3–6
Cleaning	1	3	3
Assistant nursing and other services	0–2	3	3
Total	**3–6**	**14–15**	**15–24**

- For more information refer directly to the ECDC guideline here: https://www.ecdc.europa.eu/sites/default/files/documents/novel-coronavirus-personal-protective-equipment-needs-healthcare-settings.pdf

Conclusion

When implementing infection prevention and control for COVID-19 in the setting of limited resources, an understanding of the basic concepts of the transmission of infection, standard precautions, and source control protocols is necessary.

This document offers a simplified outline based on recommendations by CDC, IDSA, WHO, and other larger organizations. For a comprehensive recommendation, please refer to your local institutional guidelines as well as local resources available. Some references are provided in the table below for guidance.

Helpful Resources	Links
Hand Hygiene Guidelines (CDC)	https://www.cdc.gov/handhygiene/providers/guideline.html
Using PPE (CDC)	https://www.cdc.gov/coronavirus/2019-ncov/hcp/using-ppe.html
Donning and Doffing of PPE (CDC)	https://www.cdc.gov/hai/pdfs/ppe/ppe-sequence.pdf
Decontamination and Reuse of Filtering Facepiece Respirators (CDC)	https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/decontamination-reuse-respirators.html
Rational Use of PPE (WHO)	https://apps.who.int/iris/handle/10665/331695
PPE Needs in Healthcare Settings; Table 2 - Minimum Number of PPE Sets Per Patient Per Day (ECDC)	https://www.ecdc.europa.eu/sites/default/files/documents/novel-coronavirus-personal-protective-equipment-needs-healthcare-settings.pdf

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9. Infectious Diseases Society of America Guidelines on Infection Prevention in Patients with Suspected or Known COVID-19. Infectious Diseases Society of America Guidelines on Infection Prevention in Patients with Suspected or Known COVID-19. https://www.idsociety.org/COVID19guidelines/ip. Published April 27, 2020. Accessed April 30, 2020.

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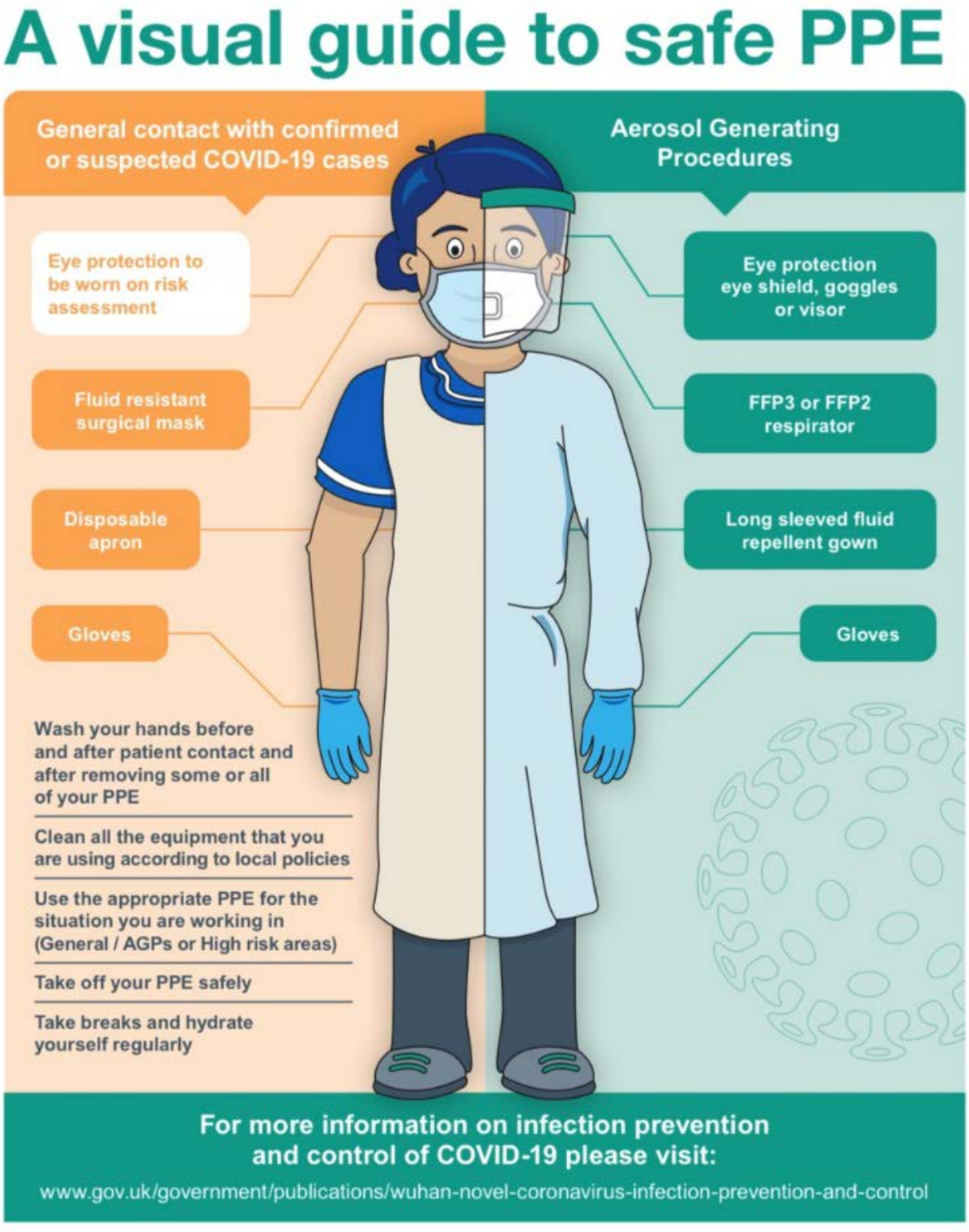
12. Personal protective equipment (PPE) needs in healthcare settings for the care of patients with suspected or confirmed novel coronavirus (2019-nCoV). European Centre for Disease Prevention and Control. https://www.ecdc.europa.eu/en/publications-data/personal-protective-equipment-ppe-needs-healthcare-settings-care-patients. Published February 7, 2020. Accessed May 1, 2020.

11. Current recommendations for Personal Protective Equipment (PPE) in COVID-19:

Dr. Md Nayeem Hasan, Dr. Javed Imam, Dr. Arifa Siddika



Hospital areas should be designated carefully and marked as 3 different levels for ensuring adequate, appropriate level of PPEs:

1. Red Zone (High Risk area) – e.g Aerosol Generating Procedures are regularly done

2. Yellow Zone – (Moderate risk area)- Confirmed or suspected COVID 19 patients but no regular AGPs

3. Green Zone (Low Risk Area) – Non COVID wards

Aerosol-generating procedures (AGPs)

Procedures and patient care activities that can result in the release of airborne particles (aerosols). AGPs can create a higher risk of airborne transmission of infections. The following procedures are currently considered to be potentially infectious AGPs for COVID-19:

1) Endo tracheal intubation, extubation and related procedures
2) Manual bag valve ventilation and open suctioning of the respiratory tract (including the upper respiratory tract)
3) Tracheotomy or tracheostomy procedures (insertion or open suctioning or removal of tracheostomy tube)
4) Bronchoscopy and upper ENT airway procedures that involve suctioning
5) Upper GI endoscopy
6) Naso Gastric tube insertion/ removal
7) Surgery and post mortem procedures involving high-speed devices (i.e diathermy, laparoscopic surgery)
8) Some dental procedures (for example, high-speed drilling, scaling)
9) Non-invasive ventilation (NIV); Bi-level Positive Airway Pressure Ventilation (BiPAP) and Continuous Positive Airway Pressure Ventilation (CPAP)
10) High Frequency Oscillatory Ventilation (HFOV)
11) Induction of sputum

Red Zone High risk acute areas:

1. ICU or areas with invasive/ mechanical ventilation
2. Emergency department -Resuscitation areas or areas involving procedures of high-risk transmission e.g AGP or chance of contact with body fluid
3. Wards with non-invasive ventilation.
4. Operating theatres.
5. Endoscopy units for
   I. upper Respiratory,
   II. ENT
   III. Upper GI endoscopy
6. other clinical areas where AGPs are regularly performed.

All AGPs or in High risk areas (Red Zones) Needs higher level PPE –

1. Scrubs and FFP2/FF3 / KN95/N95 respirators – For all time and All staffs
2. Disposable Fluid resistant gown – long sleeve and full cover, Disposable plastic Aprons, and Disposable Gloves (For any patient contact)
3. Face / Eye protection – Goggles or full-face visors (Only for patient contacts involving AGPs)

2. Yellow Zone – (Moderate risk area)-

a. Minimum PPE to enter:

All staffs - Fluid resistant surgical masks

b. Minimum for patient contact:

- Eye protection
- Plastic Apron
- Gloves

Any Aerosol generating procedure:

- FFP3/n95 mask
- Eye protection
- Gown
- Gloves

3.Green Zone–

Recommended PPE for patient contact (When health care professionals are less than 2 meters with patient):

- Surgical masks
- Eye protection
- Gloves
- Plastic Apron

- A short video guide to fitting the 3M 1863 FFP3 mask is available here - **https://youtube.com/watch?v=-HNCe4ISTfg** ****NEW - 3rd April 2020**

- WHO guidance for masks - https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks
  https://www.youtube.com/watch?v=P3fIZuW9P_M&feature=emb_rel_end
  https://www.youtube.com/watch?v=v93rcPkFkZc&feature=emb_rel_end

Summary of recommended PPE in different areas of Hospital

Context	Gloves	Plastic Apron	Gown	Surgical Mask	FRSM (IIR)	FFP2/3 or N95	Face / Eye Protect[1]
Performing a single AGP [2,9]on possible or confirmed case outside Red Zone[4]	Single use[5]	X	Single use[5]	X	X	Single use[5]	Single use[5]
Working in Red Zone[4] with possible[3] or confirmed cases	Single use[5]	Single use[5]	Sessional use[6]	X	X	Sessional use[6]	Sessional use[6]
Working inpatient with possible[3] or confirmed cases- Direct Care within 6 ft	Single use[5]	Single use[5]	X	X	Sessional use[6]	X	Sessional use[6]
Working inpatient with possible or confirmed cases Not within 6 ft	X	X	X	X	Sessional use[6]	X	Single[5] or Sessional[6]
Working in Emergency department / Acute assessment – Direct patient care within 6 ft	Single use[5]	Single use[5]	X	X	Sessional use	X	Risk assess[7] Sessional [6]
All individuals transferring Possible[3] or confirmed cases (within 6 ft)	Single use[5]	Single use[5]	X	X	Single[5] or Sessional [6]	X	Risk assess[7] Single[5] or sessional[6]
Operation theatre with possible [3]or confirmed cases (Not AGPs)	Single use[5]	Single use[5]	Risk assess[7] single use [5]	X	Single[5] or Sessional [6]	X	Single[5] or Sessional[6]
Labour ward – 2nd/3rd stage labour of Vaginal delivery – possible[3] or confirmed cases	Single use[5]	Single use[5]	Single use[5]	X	Single[5] or Sessional [6]	X	Single[5] or Sessional[6]
Inpatient care to any individuals in the extremely vulnerable group undergoing shielding [8]	Single use[5]	Single use[5]	X	Single use[5]	X	X	X

. More details -

1. Face / Eye Protection - may be single or reusable face/eye protection/full face visor or goggles.

2. The list of aerosol generating procedures (AGPs) has been described above.

3. A COVID case is any individual meeting case definition for a possible or confirmed case: Case definitions: possible case, as of 13 March 2020

3.1 Patients who meet the following criteria (inpatient definition)-

a. requiring admission to hospital and have either clinical or radiological evidence of pneumonia. **b.** acute respiratory distress syndrome (ARDS) **or c.** influenza like illness (fever ≥37.8°C and at least one respiratory symptom

3.2 Patients who meet the following criteria and are well enough to remain in the community-

a. new continuous cough and/or b. high temperature Individuals with cough or fever should stay at home.

4. Higher risk acute areas / Red zone as described above where AGPs done regularly

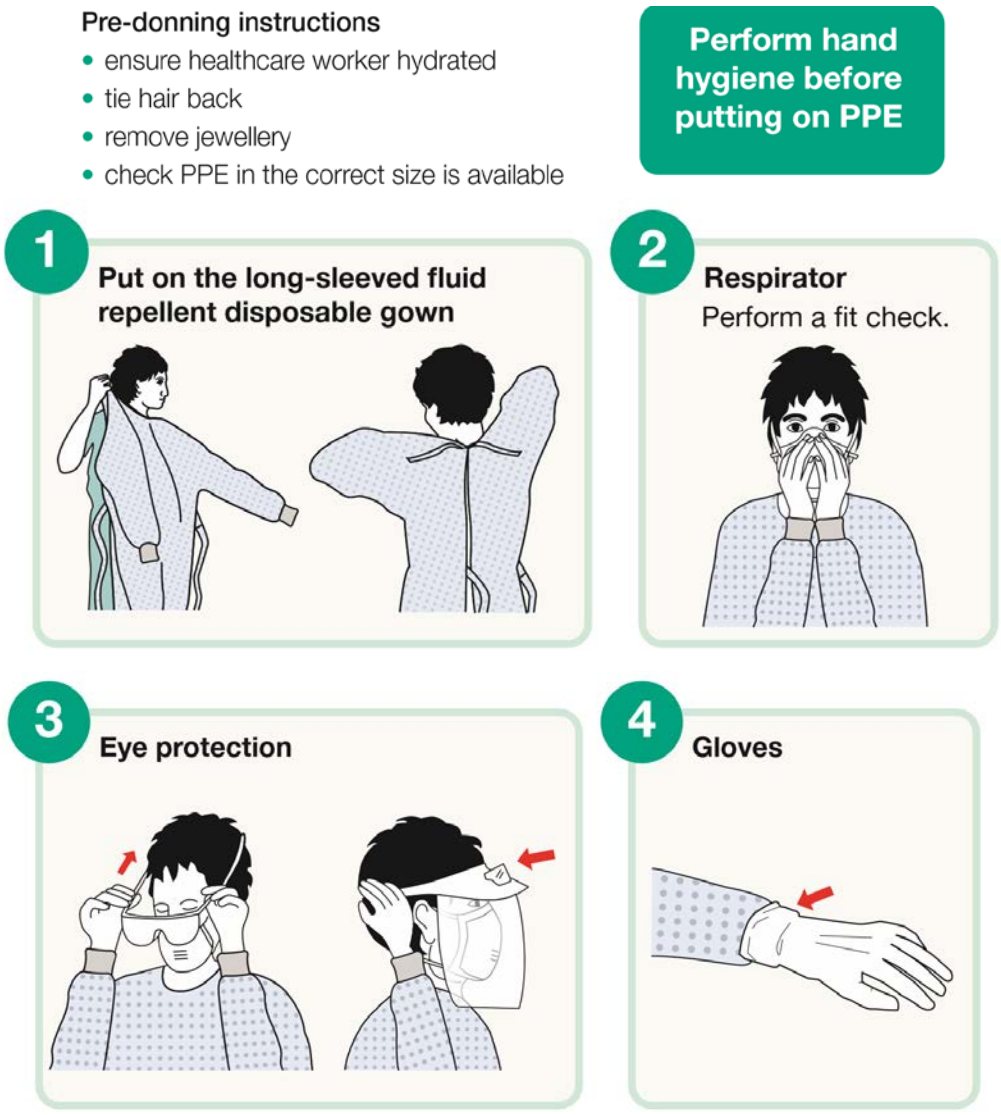
5. Single use refers to disposal of PPE or decontamination of reusable items e.g. eye protection or respirator, after each patient and/or following completion of a procedure, task, or session; dispose or decontaminate reusable items after each patient contact.

6. A session refers to a period of time where a healthcare worker is undertaking duties in a specific care setting/exposure environment e.g. on a ward round; providing ongoing care for inpatients. A session ends when the healthcare worker leaves the care setting/exposure environment. PPE should be disposed of after each session or earlier if damaged, soiled, or uncomfortable.

7. Risk assessed use refers to utilising PPE when there is an anticipated/likely risk of contamination with splashes, droplets of blood or body fluids.

Donning and Doffing of PPE:

COVID-19: Donning of Personal Protective Equipment (PPE)



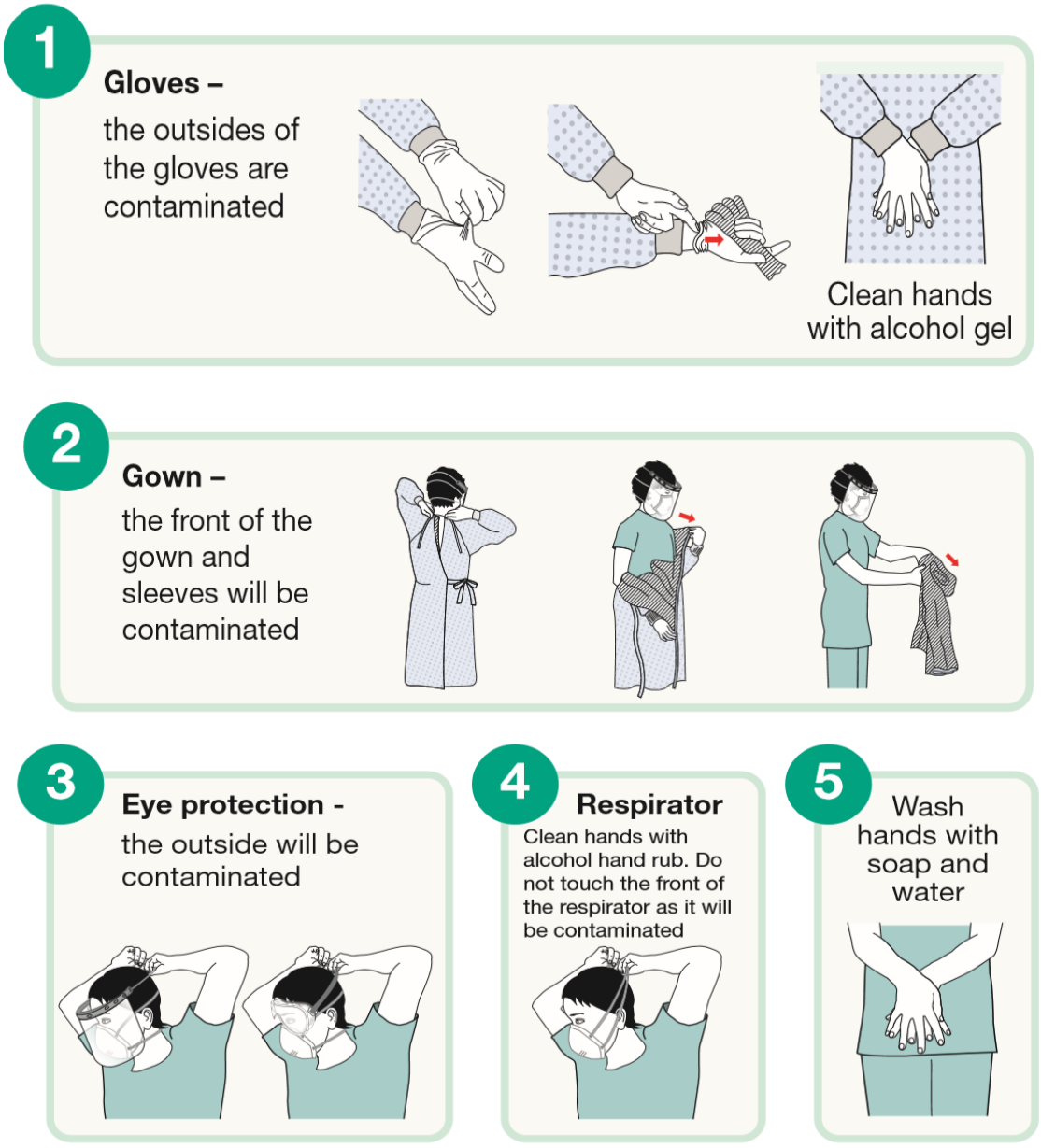
PPE should be put on and removed in an order that minimises the potential for self-contamination.

https://www.youtube.com/watch?v=kKz_vNGsNhc

Remember –

1. Ensure Proper Fit while wearing Respirator – making sure nose and mouth properly covered, mould the metal part over the bridge of the nose and press all around the face seal to be sure it is tightly in place no air leaks around the edges .
   Avoid touching the mask while wearing it. Do not leave the mask hanging from one ear or hanging around neck, after each use, please take highest care and properly dispose the masks after use

COVID-19: Removal of Personal Protective Equipment (PPE)



The order for PPE removal is *(Please note multiple time hand hygiene required to reduce risk of contamination)*

1. gloves
2. hand hygiene
3. apron or gown
4. eye protection
5. hand hygiene
6. surgical face mask or FFP3 respirator
7. hand hygiene

https://www.youtube.com/watch?v=oUo5O1JmLH0

Remember –

1. Remove the mask using the appropriate technique: After putting on, never touch the front of the mask, untie it from behind. Do not touch the front of the gown or gloves as they are contaminated with viruses. If by any chance, after removal or whenever inadvertently touched, clean hands using an alcohol-based hand rub or soap and water if hands are visibly dirty – please wash hands properly with soap. Do not touch face, mouth, nose or eyes.
2. Replace masks as soon as they become damp with a new clean, dry mask. • Do not re-use single-use masks. • Discard single-use masks after each use and dispose of them immediately upon removal.

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2. Public Health England guideline for NHS UK developed with Academy of Royal Colleges, UK and Health Protection Scotland
3. WHO guidance on infection Prevention: COVID19

RELATED CONTENT

- Public Health England individual guidance for COVID-19
- Cancers and COVID19
- Cardiovascular conditions and COVID-19
- Endocrine conditions and COVID-19
- Gastrointestinal conditions and COVID-19
- Haematology conditions and COVID-19
- Neurological conditions and COVID-19
- Other infections and COVID-19
- Pregnancy and COVID-19
- Renal conditions and COVID-19
- Respiratory conditions and COVID-19
- Rheumatology conditions and COVID-19
- Other Occupational Health Guidance and COVID-19

12. Protection for Health care workers

Dr. Shakil Farid, Dr. Sabyasachi Roy

Identification of health care workers (HCW) at risk

High Risk Group

HCW should work from home and should be removed from direct frontline for 2-3 months during the peak period. It will include only a small proportion of HCW.

Includes:

•Solid organ transplant recipients

•People with specific cancers:

a) People with cancer who are undergoing active chemotherapy or radical radiotherapy for lung cancer
b) People with cancers of the blood or bone marrow such as leukaemia, lymphoma or myeloma who are at any stage of treatment
c) People having immunotherapy or other continuing antibody treatments for cancer
d) People having other targeted cancer treatments which can affect the immune system, such as protein kinase inhibitors or PARP inhibitors
e) people who have had bone marrow or stem cell transplants in the last 6 months, or who are still taking immunosuppression drugs

•People with severe respiratory conditions including severe asthma and severe COPD, cystic fibrosis.

•People with rare diseases and inborn errors of metabolism that significantly increase the risk of infections (such as SCID, homozygous sickle cell).

•People on immunosuppression therapies sufficient to significantly increase risk of infection.

•Women who are pregnant with significant heart disease, congenital or acquired.

Moderate Risk Group

Should work remotely well away from the frontline. They can still contribute in many ways away by avoiding high risk area, i.e. avoid exposure prone procedure, avoid performing aerosol generating procedures in patients with COVID.

Includes:

•Chronic (long-term) respiratory diseases, e.g. chronic asthma, chronic obstructive pulmonary disease (COPD), emphysema or bronchitis

•Chronic heart disease, such as heart failure

•Chronic kidney disease

•Chronic liver disease, such as hepatitis

•Chronic neurological conditions, such as Parkinson's disease, motor neuron disease, multiple sclerosis (MS), a learning disability or cerebral palsy

•Diabetes

•Problems with spleen – for example, sickle cell disease or splenectomized patient

•A weakened immune system - such as HIV and AIDS, or medicines such as steroid tablets or chemotherapy

•Seriously overweight (a BMI of 40 or above)

•Aged over 70 years, regardless of health conditions

•Pregnant women under 28 weeks' gestation with no underlying health conditions.

1. Providing appropriate PPE in the high risk area.
   One of the most important areas is the emergency department/ OPD, where the COVID status of the patients is unknown. There should be a designated **RED zone** in the emergency department where appropriate PPE should be provided.

2. Frequent testing of frontline staff and isolating the ones who are positive. It's also important to test their contacts as well.

3. Mental helpline to the frontline staff.
   Many of the frontline health care workers are at risk of developing post-traumatic stress disorder, stress related fatigue etc. It's important to create a mental health help line or counselling services for those in need.

4. Change in the pattern of shift work which will reduce the number of health care workers exposed on the front line at the same time. Various shift patterns have already been implemented in Bangladesh and other countries such as few days on and few days off (example dividing the HCWs in few teams and have 12 hour shift for 3-5 consecutive days followed by few days off).

5. Provision of alternate accommodation should be provided to those with vulnerable family members at home.

6. Please note that there is NO EVIDENCE TO RECOMMEND THE USE OF CHEMOPROPHYLAXIS with hydroxychloroquine[1].

7. Minimise the frequency of patient encounters i.e. use of automated machines to check observations, use of once daily IV antibiotics where possible.

Reference: https://www.cebm.net/covid-19/hydroxychloroquine-for-covid-19-what-do-the-clinical-trials-tell-us/

13. Extended use or re-use of N-95/FFP3 and reusable gowns

Dr Tasmin Sultana, Ms Verona Beckles

There is acute shortage of PPE throughout the world. Due to the acute shortage it's really important to optimise the use of PPE and reuse them wherever possible.

Key Points:

- It's important to discard N95/FFP3 masks contaminated with blood, respiratory or nasal secretions.
- A cleanable face shield or surgical mask on top of this mask to prevent spilling of bodily fluids can be used.
- Clean hands with soap and water or an alcohol-based hand sanitizer before and after touching or adjusting the respirator (if necessary, for comfort or to maintain fit).
- Avoid touching the inside of the respirator. If inadvertent contact is made with the inside of the respirator, discard the respirator and perform hand hygiene as described above.
- Recommended max continuous use of 8 hours in one day between breaks for these masks is extended use. *One mask can be re-used max up to 5 cycles without loosing its functional integrity.

***Taking it off(doffing)in the same day during meal break/toilet break and wear it back(donning) after break with precautions is of crucial importance.

- **If you have 5 of N-95/FFP3 masks, you can re-use them up to 25 days, max up to 5 cycle per mask recommended by the CDC without damage or changing its functional integrity.**

Day 1- Doffing mask no. 1 using the ribbon attached on the edge of mask, put it in paper bag, write 1 on bag for mask no.1, put it away in well-lit area for next re-use on day 6(on the polymer fabric of N-95/FFP3 the virus may be viable up to 2-3 days max, as the closest to it is cardboard on which virus survive only 24hr).

Day 2-Use the mask no.2 on day 2, doffing after hand wash and with precautions, put it in paper bag, write No. 2 on it, keep it away in well-lit area for re-use on day 7.Repeat same cycle for the mask no. 3, 4 and 5 , after using them accordingly **on day 3,4 and 5.**

Day 6- you will wear the mask you have worn on day 1, as kept it no. 1 labelled bag, re-use as you will use a new one as there is no viable virus attached to its surface.

- There are 3 ways of decontaminating N-95/FFP3, none can be done by individual but in a given facility

1.VHP-Vaporised hydrogen peroxide-USA-FDA issued

2.UVGI-Ultraviolet ray germicidal irradiation-USA-FDA not issued

3.Moist heat-USA FDA not issued

- Washing of Reusable gowns: Most of the reusable PPE gowns used in Bangladesh are made of parachute material. Ideally, they should be sterilised using hydrogen peroxide gas plasma sterilization method. This is happening in most of the hospitals in the big cities where facilities are available. However, where these facilities are not available (in villages or small towns) detergent boiled water and occasionally bleach mixed boiling water can be used to sterilise them (taken from local sources in Bangladesh).

Reference:
https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedguidanceextuse.html

14. Heart disease and COVID-19

Dr Farhana Tasneem Rimi, Dr Shakil Farid, Dr Rana Sayeed, Dr Omar Hasan

Aim

The purpose of this guideline is to maximize the safety of patients with cardiac conditions during coronavirus pandemic. The recommendations reflect existing national and international guidance and policies.

COVID-19 in patients with pre-existing cardiological conditions

COVID-19 not only causes viral pneumonia but has major implications for the CV system. Patients with CV risk factors have been identified as particularly vulnerable populations with increased morbidity and mortality when suffering from COVID-19.[1,2] Moreover, a considerable proportion of patients may develop cardiac injury in the context of COVID-19 which portends an increased risk of in-hospital mortality. In a retrospective cohort study of 72314 cases in China[3] patients with CV comorbidities had fivefold higher mortality risk (10.5

Obligatory inpatients:

Emergency cases will continue to require admission and ongoing management, eg myocardial infarction, class IV heart failure, arrhythmias (such as uncontrolled AF or VT), endocarditis. Rapid treatment and discharge should be aimed for these patients.

STEMI: Primary PCI remains the reperfusion therapy of choice if feasible within the time frame. The COVID-19 pandemic should not compromise timely reperfusion of STEMI patients. In the absence of previous SARS-Co-V2 testing, all STEMI patients should be managed as if they are COVID-19 positive. Thrombolysis is not a preferred option but may be considered on a case-by-case basis for unstable patients with coronavirus pneumonia who develop a STEMI.

Elective inpatients/day case activity:

All elective admissions should be deferred unless absolutely necessary.

PCI: elective PCI should be deferred.

NSTEMI:

High risk patients: Patients need to be assessed on a case-by-case basis and, where possible, current management strategies followed. If this is not possible due to ITU capacity or other issues, then PCI should be used in place of surgery in multi-vessel disease where feasible. For patients at high risk, medical strategy aims at stabilization whilst planning an early (< 24 hours) invasive strategy.

Low risk patients: Patients with Troponin rise and no acute clinical signs of instability (ECG changes, recurrence of pain) might be managed with a primarily conservative approach. Non-invasive imaging using CT Coronary Angiogram may speed-up risk stratification, avoid an invasive approach allowing early discharge.

The inpatient stays should be minimised to 36–48 hours. Inpatient echocardiography can be waived for stable patients. In COVID-19 infected patients, echocardiography should focus solely on the acquisition of images needed to answer the clinical question in order to reduce patient contact with the machine and health care provider.

Valvular disease: The elective valve interventions should be deferred. The patients in heart failure or at high risk of admission in heart failure should be considered on a case-by-case basis and current way of management followed where possible. If this is not possible due to a shortage of ITU beds or other constraints, in UK TAVI has been considered where possible instead of surgery in order to reduce the length of hospital and ITU stay. In the absence of TAVI it's important to refer only critically ill patients for surgery (i.e. severe mitral regurgitation with severe heart failure symptoms and ventricular dysfunction, critical aortic stenosis etc).

Bradycardia pacing: The urgent pacemaker implants for symptomatic AV block should continue. The implants for sinus node disease can reasonably be deferred. Consider remote monitoring of devices.

Outpatients:
Consideration should be given to the urgency of the appointment, the requirement for diagnostics and the need for face-to-face contact. Where possible, appointments should be conducted remotely by telephone, e mail or video consultation and non-urgent appointments deferred.

Heart failure: Patients with chronic HF should closely follow protective measures to prevent infection. Ambulatory stable HF patients (with no cardiac emergencies) should refrain from hospital visits. Guideline-directed medical therapy (including beta-blocker, ACEI, ARB or sacubitril/valsartan and mineralocorticoid receptor antagonist), should be continued in chronic HF patients, irrespective of COVID-19. Telemedicine should be considered whenever possible to provide medical advice and follow up of stable HF patients.

Hypertension: Most patients with hypertension require only infrequent visits to the clinic to manage their hypertension. Many patients with treated hypertension will be in self isolation to reduce the risk of COVID-19 infection and unable to attend for their usual routine clinical review. When possible, patients should monitor their own BP as frequently as they usually would, using a validated home BP monitor.[4]

Concern has been expressed that treatment with ACEIs or ARBs might increase the risk of infection, or developing the severe consequences of infection with COVID-19.[5,6] This concern originates from a hypothesis that links the observations that COVID-19 invades cells by binding to the enzyme ACE2 which is ubiquitous and expressed on the surface of alveolar cells in the lung.[7,8] In some animal studies, but all, ACEIs or ARBs have been shown to increase ACE2 levels mainly in cardiac tissue.[9,10]

Indications for surgical intervention:

Wherever possible it's important to explore non-surgical options during the peak period.

Emergency (within 24 hours):

1. Repair of acute type A aortic dissection
2. Repair of ischaemic VSD
3. MI with severe haemodynamic instability where PCI is not an option
4. Severe ischaemic mitral regurgitation with haemodynamic instability

Urgent (within 72 hours)

1. Coronary artery disease with rest pain not amenable to PCI and non-responsive to maximal anti-anginal medication
2. Myxoma (with emboli and/or haemodynamically unstable)
3. Severe aortic valvular disease with haemodynamic instability/deteriorating symptoms (syncope/critical aortic stenosis/heart failure)
4. Severe mitral regurgitation with deteriorating symptoms (severe ischaemic mitral regurgitation)

Clinically Urgent Elective (within a month)

1. Severe coronary artery disease with complex anatomy (severe LMS, severe 3VD not amenable to PCI) and limiting symptoms
2. Severe aortic valve disease with symptoms on minimal exertion and/or deteriorating LV function
3. Severe mitral valve disease with symptoms on minimal exertion and/or deteriorating LV function (mitral stenosis unsuitable for balloon valvotomy)
4. High-risk recent NSTEMI where PCI is not an option.
5. Aortic aneurysm (Ascending aorta >6 cm, >5.5 cm in presence of connective tissue disease or family history of rupture/dissection, recent increase in dimensions or symptoms).

Managing patients with cardiovascular disease during COVID 19 pandemic: a personal perspective with case examples

Dr. Kazi Asif Adnan

The previous section provides a summary of some of the emerging evidence base with regards to COVID19 infection and its cardiovascular effect as well as recommendations from UK/European cardiology guidelines. In this section, 3 cases seen in last few weeks are discussed to provide some practical insight. All such recommendations are under regular review as we learn more about this new disease.

Case 1:

A 66-year-old man with severe COVID 19 pneumonia was transferred to ITU for intubation and ventilation. His HS-Troponin was raised, and ECG showed sinus tachycardia. Initial echocardiogram, pre-intubation, showed normal cardiac function. 4 days later, while his ventilation parameters were getting worse, a repeat echocardiogram showed severe RV and LV dysfunction with LVEF <20%. He was in sinus tachycardia and his BP was stable without any ionotropic support. He developed AKI and was put on CVVH. He was started on small dose of cardio selective beta blocker, ACE-I and spironolactone for his severe LV dysfunction. He gradually improved in terms of his ventilation parameters and a repeat echocardiogram after a week showed cardiac function completely back to normal.

Case 2:

84 year old female patient with known atrial fibrillation was admitted with COVID19 Pneumonia. She had persistent tachycardia (HR 130-160, AF) and was loaded with Digoxin and her Diltiazem was increased with no real effect on her HR. She continued to deteriorate with higher oxygen requirement and eventually was palliated as Intubation and ventilation was not appropriate due to poor baseline functional status.

Case 3:

72 year old known COPD patient presented with chronic cough, shortness of breath and 2 days of cardiac sounding CP. ECG showed inferior STEMI and showed some bilateral patchy consolidation. He was immediately transferred to the designated Cath lab following local COVID19 pathway and underwent PPCI to his occluded distal RCA. While his respiratory symptoms were mostly chronic, a COVID 19 swab was sent due to the changes on CxR which came back positive. He made good recovery, did not have any signs of hypoxia and was discharged home after 48 hours with safety advice.

Key points:

- Significant LV and RV dysfunction has been noted in COVID19 patients. Several mechanisms have been suggested including myocarditis, Takotsubo like syndrome and/or general myocardial depression due to systemic infection. Such cardiac dysfunction, which can be often transient, has also been noted in ITU patients in the past with severe infection/ sepsis. While these patients can be tried on conventional 'disease modifying' therapy for heart failure, there is no evidence about their efficacy.
- Debate exists about the role of ACE-I/ ARB in COVID19 patients. However, currently the evidence doesn't point to either harm or benefit whereas their role in severe cardiac dysfunction is well proven.
- Tachy-arrhythmias such as Atrial Fibrillation/ Flutter/ SVT are often associated with any infection as a new onset arrhythmia or poses challenges in rate control. While some rate limiting treatment and formal anticoagulation for AF should be considered, most often the HR will not respond well unless and until the underlying infection and dehydration etc. are well treated.
- All STEMIs, where possible, require immediate revascularisation with PPCI due to significant mortality and morbidity benefits. As most of them present from the community and time is limited to assess there COVID19 status, all STEMI cases are treated as suspected COVID19.
- For centers offering PPCI service for STEMI, all staff inside the Cath lab should have PPE 2 (FFP3/N95 respirator masks, full sleeve fluid repellent aprons, visors/ goggles, theatre cap) as per the recommendations from BCS. While PPCI is not an aerosol generating procedure, STEMI patients are unstable and often suffer cardiac arrest during the procedure requiring resuscitation including CPR which is an aerosol generating procedure and necessities PPE2 as per the latest guideline from resuscitation council UK. Also, Cath labs need to undergo 'deep clean' after any highly suspected or confirmed COVID19 patients as otherwise significant risk to multiple staff members and other patients due to risk of cross infection.
- If PPCI service is not accessible in a timely manner or cannot be delivered safely, thrombolysis still remains as the next preferred option for STEMIs.

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15. Kidney disease and COVID-19

Dr. Sarah Choudhury, Dr. Tasbirul Islam

Initial reports from Wuhan suggested that the burden of acute kidney injury with COVID-19 infection was relatively low, ranging from 3% to 9%, subsequent analyses demonstrated incidence rates as high as 15% and the incidence of needing renal replacement therapy might be close to 15-25%. Acute kidney injury is more common among patients with more severe disease, particularly in the intensive care unit (ICU) setting. The acute kidney injury (AKI) was mostly due to acute tubular necrosis, with the addition of a few cases of rhabdomyolysis. Most AKI developed within 7 days of admission.

1-Do you recommend that medical management be exhausted before using RRT?

--If patient is hypervolaemic causing respiratory failure, try loop diuretics. If patient is hypovolemic, then try intravenous fluid. If patient is hypotensive, then try intravenous fluid, vasopressor to increase the blood pressure. Avoid nephrotoxic drugs.

2--Are you delaying RRT longer because of the shortage of machines or any clinical reasons?

We've to use RRT wisely, otherwise hospital will run out of machine and supplies.

3-Is continuous renal replacement therapy (CRRT) the preferred modality?

CRRT is preferred over conventional HD or PD in hemodynamically unstable patient.

4- What about resource-wise in terms of preserving dialysate?

Decrease flow rate to 15 ml/kg/hr from typical flow rate 20-25 ml/kg/hr to conserve resources.

5-What about anticoagulation in RRT?

Higher risk of filter clotting in COVID 19 patient. Anticoagulation is very important in COVID 19 patient and UFH is anticoagulation of choice.

6-Prefered vascular access?

RIJ→Femoral→LIJ

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Cheng et al. Lancet 2020.

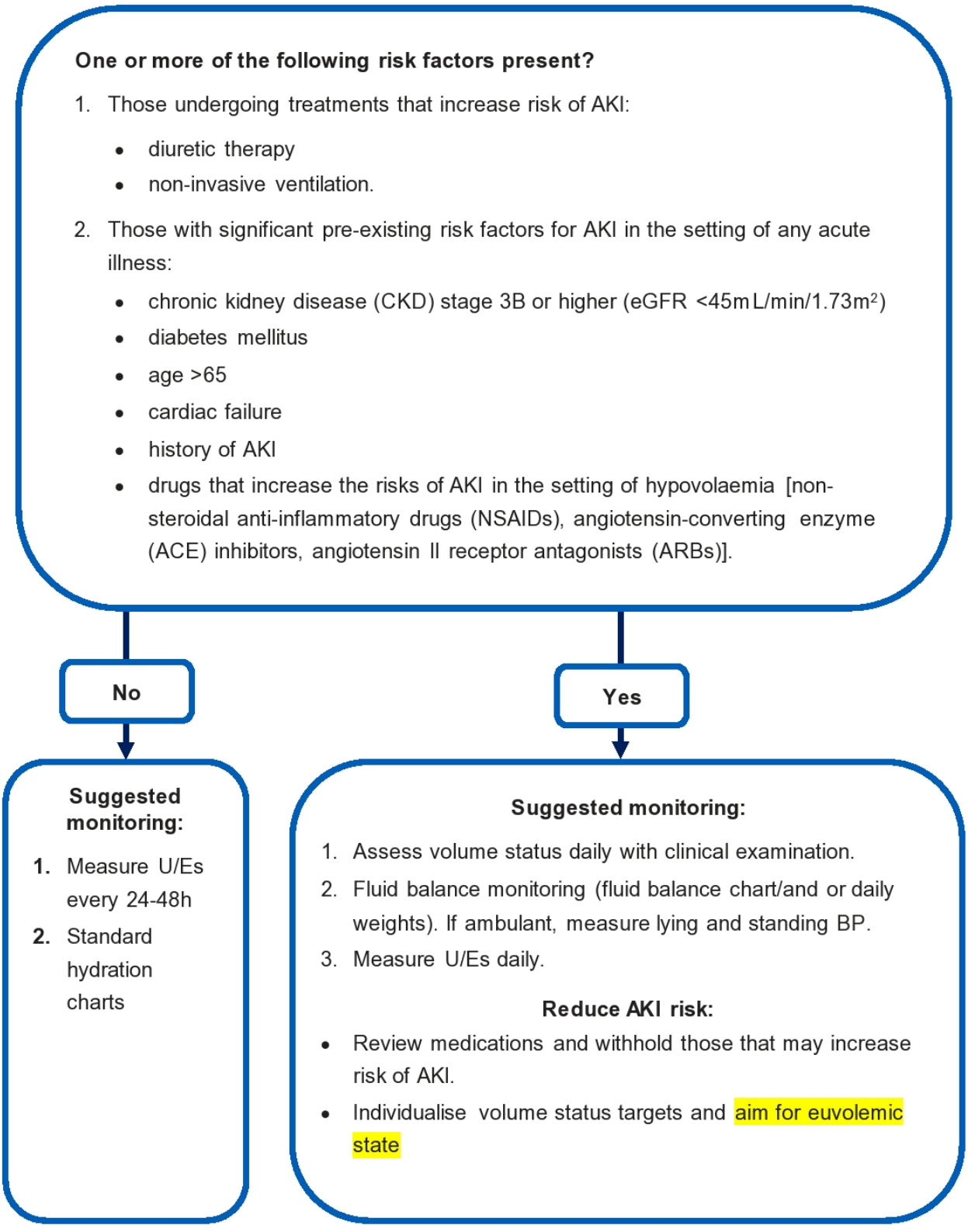
KDIGO AKI Staging

Stage	Serum creatinine	Urine output
1	≥ 1.5-1.9 times baseline (7 days) OR 26.5 µmol/L increase (48 hrs)	< 0.5 ml/kg/hr for 6-12 hrs
2	≥ 2.0-2.9 times baseline	< 0.5 ml/kg/hr for ≥12hrs
3	≥ 3.0 times baseline OR increase in creatinine to ≥ 354 µmol/L OR Renal replacement therapy	< 0.3 ml/kg/hr for ≥24hrs OR Anuria for ≥ 12hrs

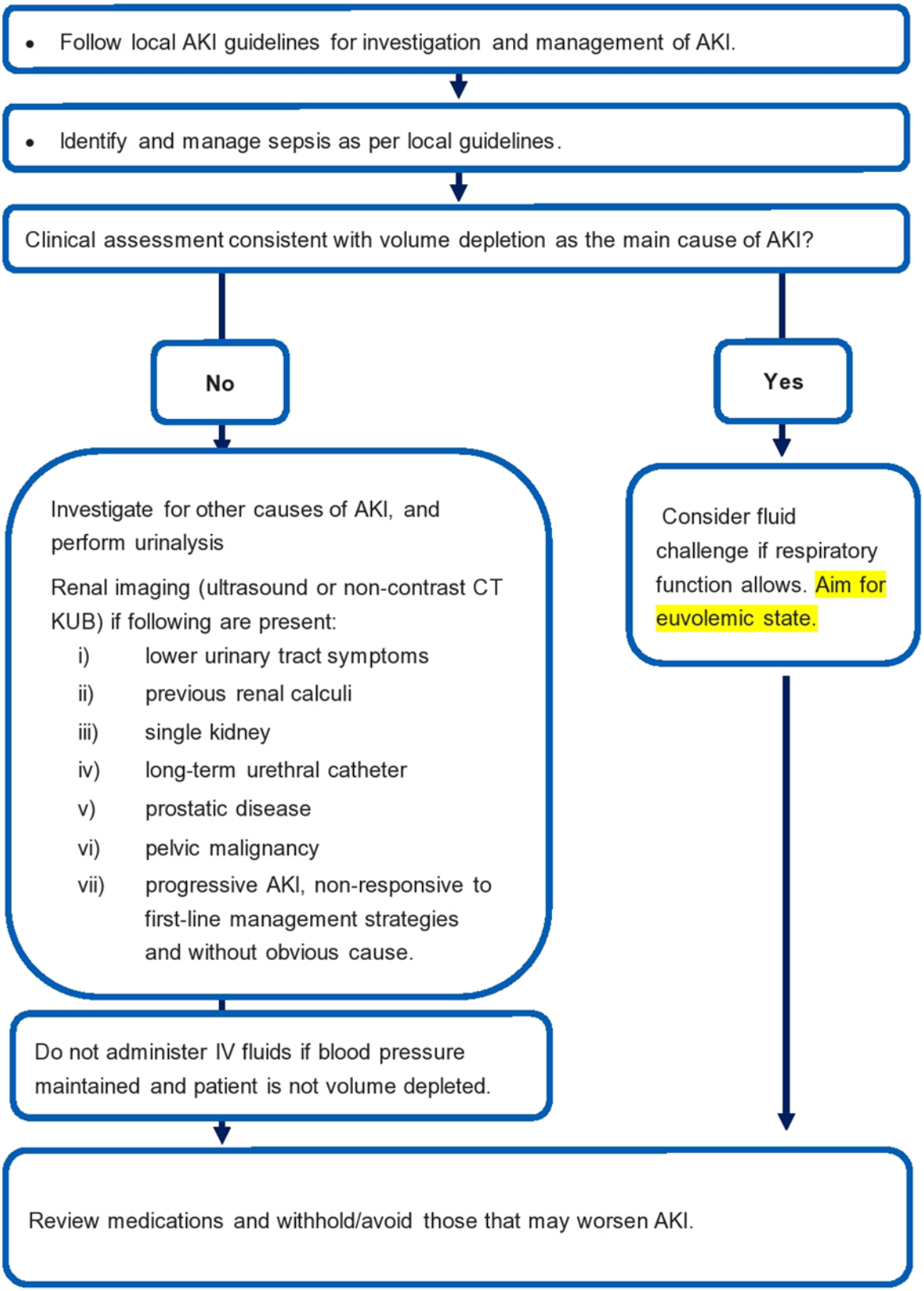
KDIGO AKI Guideline. Kidney inter., Suppl. 2012; 2: 1–138

Summary charts

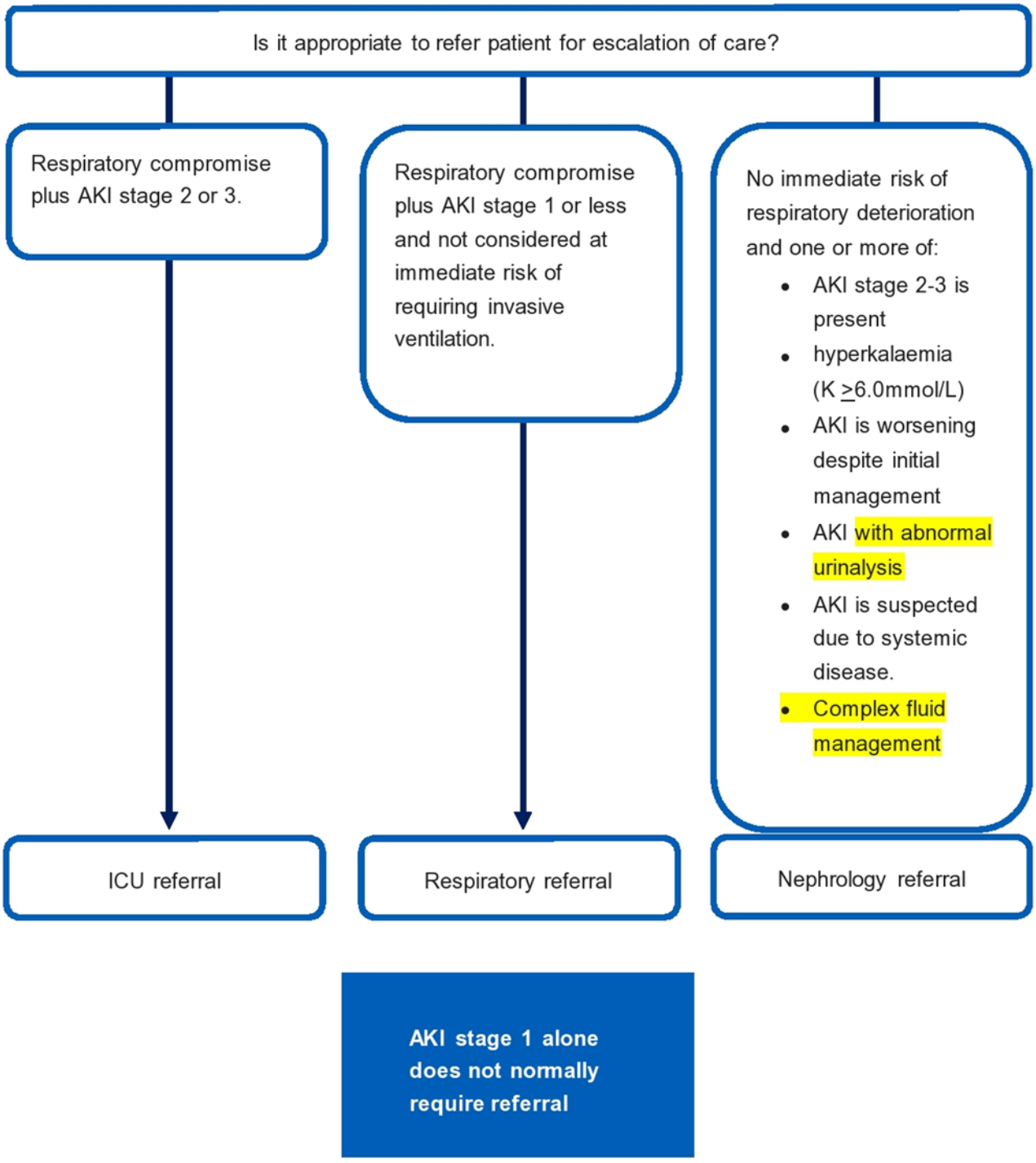
1. Assessing AKI risk



2. Responding to those who develop AKI



3. Referral



Reference:

This document has been collected and modified from the trust intranet page of Northwest Anglia NHS trust. This is a national guideline from NHS ENGLAND and NHS improvement.

16. Elderly patients and COVID-19

Dr Nashid Noor Alam, Dr Jeenat Khan

- **A) COVID 19: Special consideration and subtle differences in acute presentation of patients above 65**
- **B) Guidance for ward-based management of COVID cases (Ward round essentials**
- **C)Covid-19 Pandemic selection of patients above the age if 65 for suitability for escalation of care beyond ward level including Invasive ventilation in ICU setting**
- **D)End Of life care for Elderly Covid Patients who continues to decline and not for escalation:**

A) COVID 19:Special consideration and subtle differences in acute presentation of patients above 65

It is well recognised that due to physiological changes associated with normal ageing process many diseases present non classically or in a different way in patients above the age of 65 in the acute medical take. Not recognising this leads to adverse outcome and clinical errors in management of elderly and even misdiagnosis.

In this challenging time of the COVID-19 pandemic we should be mindful that presentation of COVID in patients above 65 as above can be quite different so a high index of suspicion and low threshold to isolate, test and manage these patients are absolutely vital.

Admitting doctor and the consultants responsible for the patients should be mindful of the following as per British Geriatric Society and Regional Geriatric programme of Toronto guidelines which is freely available online and summarised below:

- Typical symptoms of COVID-19 such as fever, cough, and dyspnoea may be absent in the elderly despite respiratory disease
- Only 20-30% of geriatric patients with infection present with fever
- Atypical COVID-19 symptoms include delirium, falls, generalized weakness, malaise,
- functional decline, and conjunctivitis, anorexia, increased sputum production, dizziness, headache, rhinorrhoea, chest pain, haemoptysis, diarrhoea, nausea/vomiting, abdominal pain, nasal congestion, and anosmia

- Tachypnoea, delirium, unexplained tachycardia, or decrease in blood pressure may be the presenting clinical presentation in older adults

- Threshold for diagnosing fever should be lower, i.e. 37.5°C or an increase of >1.5°C from usual temperature

- Older age, frailty, and increasing number of comorbidities increase the probability of an atypical presentation.
-
- Older adults may present with mild symptoms that are disproportionate to the severity of their illness

(Ref: British Geriatric Society www.bgs.org.uk)

B) Guidance for ward-based management of COVID cases (Ward round essentials)

- Wear your PPE – follow PPE guidance for correct donning of PPE. For aerosol generated
- procedures (AGP), use enhanced PPE irrespective of the treatment area
- Maintain social distancing on ward areas as much as possible (board rounds, MDT etc.)
- Maintain appropriate hygiene (hand/forearm wash etc.)
- One person to go in to see patient to reduce direct contact (should be of reasonable seniority)
- Do not take patient notes into the room or cohorted area/bay
- Check blood results and oxygen saturations/ observations before ward round if possible
- Check usual breathing status
- Ensure every patient has an escalation status even if stable on the day
- Assess for high risk factors for deterioration: heart disease, hypertension, obesity, stroke,
- diabetes, asthma, COPD, immunosuppression, cancers, increasing age/high frailty score etc.

Investigations:

- On admission- FBC, UEs, LFTs, CRP, INR, cardiac enzymes if chest pain/tightness
- During admission – blood tests as above and as indicated by clinical course
- CXR
- Blood culture, Urine culture, Sputum culture, swabs as appropriate

When with the patient:

- Assess for improvement/deterioration (ABCDE, saturation, symptoms of cough, fever, SoB)
- Inform and discuss with patient about issues like their priorities, DNACPR and escalation to ITU
- Complete DNACPR as appropriate after leaving the patient bedside.
- At least a daily review

Treatment guide:

- Oxygen: Aim for saturations between 92-96% (UHNM guide); (93-95% if pregnant and 88-90% if COPD). https://www.england.nhs.uk/coronavirus/wcontent/uploads/sites/52/2020/04/C0256-specialty-guide-oxygen-therapy-and-coronavirus-9-april-2020.pdf
- Prefer mask to nasal canula for oxygen and check flow rate hourly (4 hourly overnight))
- Fluid balance aim to achieve neutral fluid balance (**avoid iv fluids unless absolutely necessary**)
- Paracetamol for fever (avoid ibuprofen)
- Steroids- **do not use** unless for bronchospasm or patient is already on regular steroids
- Antibiotics: it is not unreasonable to give antibiotics
- for Community Acquired Pneumonia (CAP) if you think the patient has a bacterial component.
- Nursing: where possible encourage nursing the patient in **a prone position**. This is increasingly being used to improve ventilation outside critical care in the awake patient. https://www.youtube.com/watch?v=HCrSUwqoX0I
- Maintain nutrition and other good medical/nursing practices
- Bowel, catheter, pressure area, canula, care
- Continue with VTE prophylaxis (and remember that PE or CCF may co-exist)
- Check regular medication written on drug chart and rationalize it
- Remember sick day rules and consider holding nephrotoxic medication, statins, alendronate etc.
- Nebulisers: No evidence of efficacy in COVID pneumonia, and theoretical (but low) risk of spreading the virus around. So, unless the patient has a severe asthma or COPD exacerbations requiring a nebuliser don't use them. **No role for routine use of saline nebulisers**.
- If needed, try to use inhalers with a spacer device instead of nebulizers.
- Consult microbiology for antimicrobial therapy.
- **Anti-COVID treatments (antivirals, HCQ etc.): only in context of approved clinical trial.**
- **Tamiflu: no indication for use in COVID positive patients**

After seeing patient:

- Wash hands/forearms thoroughly, use PHE guidance for safe doffing
- Team members to inform family of status on phone if possible and document in notes
- Update nursing staff especially re escalation status
- A negative test for COVID or absence of fever is not needed prior to discharge/de-escalation
- Cough may persist in some individuals, and should not be a reason to continue to stay in hospital

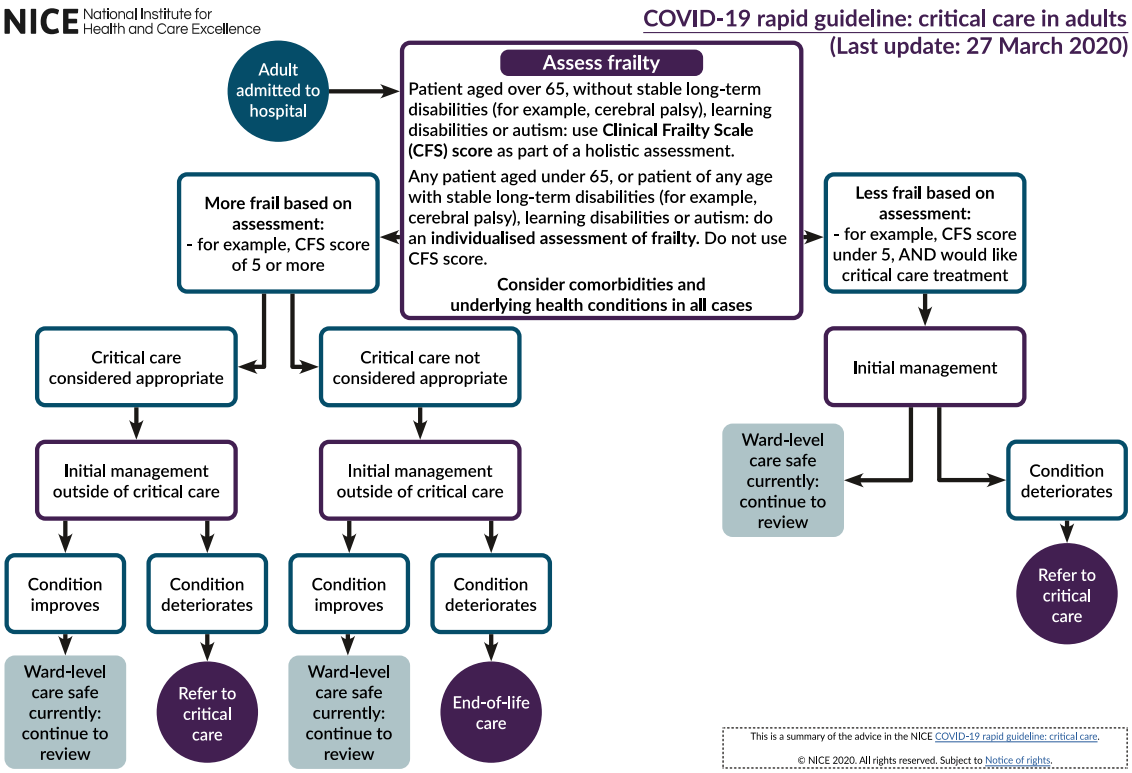
Look out for signs of deterioration:

- Severe shortness of breath or Chest pain/pressure
- Little or no urine output, Cold hands or feet, blue lips or face, mottled skin, coughing up blood,
- Neck stiffness, non-blanching rash, becoming difficult to rouse or new confusion or delirium
- Oxygen requirement of more than 4 litres to maintain saturation above 90%
- Persistent temperature >38 C beyond day 7- review, exclude concurrent infection, FBC, UEs, CRP, LFT, CXR, senior review.
- ARDS picture/General deterioration and if for escalation

(Ref: Adapted and modified from @betterageing/ https://bit.ly/covid-19wardroundguidance)

C)Covid-19 Pandemic selection of patients above the age if 65 for suitability for escalation of care beyond ward level including Invasive ventilation in ICU setting

Various tools can be used to judge the suitability of escalation of care in elderly patients but NICE(National institute of Clinical Excellence) has endorsed the following quick and easy to follow flowchart which is simple to use and based on the well validated CFS(clinical Frailty score)



Ref:NICE(https://www.nice.org.uk/guidance/ng159/resources/critical-care-admission-algorithm-pdf-8708948893)

Clinical Frailty Scale*

1 Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2 Well – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.

3 Managing Well – People whose **medical problems are well controlled,** but are **not regularly active** beyond routine walking.

4 Vulnerable – While **not dependent** on others for daily help, often **symptoms limit activities.** A common complaint is being "slowed up", and/or being tired during the day.

5 Mildly Frail – These people often have **more evident slowing,** and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6 Moderately Frail – People need help with **all outside activities** and with **keeping house.** Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.

7 Severely Frail – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8 Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9 Terminally Ill - Approaching the end of life. This category applies to people with **a life expectancy <6 months**, who are **not otherwise evidently frail.**

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging, Revised 2008.
2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

Clear communication with patients and/or next of kin if patient is unable to communicate to establish the wishes/concerns/fears and answer any questions pertinent to the patient and agreeing a common ground is absolutely vital. Miscommunication risks exacerbating anxiety and fear and medicolegal complaints.

D) End Of life care for Elderly Covid Patients who continues to decline and not for escalation:

Patients who are for maximum ward based management and have deemed unsuitable for cardiopulmonary resuscitation(CPR) should have their DNACPR status documented and cared for in the ward level with standard COVID management guidelines. However if these patients do not respond to treatment and continues to decline it would be ethical to shift to an End of Life care with comfort and dignity being the priority.

All Non-essential medications should be stopped and an individualised care pathway for terminal care should be adopted based on medical and good nursing care.

The clinical profile of COVID-19 lung disease driven dying is likely to include:

- High breathlessness / 'air hunger'
- High distress
- High delirium / agitation
- High fever
- Risk of cessation of life over a short number of hours.

Medication

<table>
<tr><th colspan="4">Breathlessness</th></tr>
<tr><td colspan="4">Consider whether the patient is benefiting from any oxygen prescribed. If not, consider discontinuing non-beneficial oxygen and using medication and non-pharmacological measures for symptom control.

Patients who are receiving medication via nebulisers may continue to do so in the context of COVID-19 lung disease. Currently corticosteroids are not recommended for managing the symptoms of dying of COVID-19 lung disease.</td></tr>
<tr><td colspan="4">Non-pharmacological measures to manage breathlessness should also be considered, these include positioning, relaxation techniques, wiping the face with cool wipes.

Fans must not be used in the context of COVID-19 infection as they increase aerosol spread of the virus.</td></tr>
<tr><td colspan="4">Early commencement of syringe pump, if available, is strongly recommended.</td></tr>
<tr><td rowspan="2">Morphine sulfate</td><td>Subcutaneous or slow intravenous injection</td><td>Start with 2 to 5mg as required; can be titrated to resolution of symptoms.</td><td rowspan="2">• Titration frequency: subcutaneous 10-15mins; intravenous 3-5mins.
• Consider using the higher dose if the patient is very distressed with breathlessness.
• Consider using lower doses in elderly patients.

• In patients who are already receiving regular opioid, use 1/6 of total daily opioid dose for as required dose.</td></tr>
<tr><td>Subcutaneous infusion</td><td>Start with 10 to 20mg over 24h.</td></tr>
<tr><td colspan="4">If the patient has known renal impairment (eGFR <30), consider using equivalent and equipotent doses of oxycodone, if immediately available, as required and alfentanil or oxycodone in an infusion.</td></tr>
</table>

Breathlessness			
Midazolam	Subcutaneous or slow intravenous injection	Start with 2 to 5mg as required; can be titrated to resolution of symptoms.	• Consider using the higher dose if the patient is very distressed with breathlessness. • Consider using lower doses in elderly patients. • Maximum dose 100mg over 24h.
	Subcutaneous infusion	Start with 10 to 20mg over 24h.	

Cough			
Morphine sulfate	Oral	5mg every hour as required	• Consider using lower doses in elderly patients. • In patients who are already receiving regular opioid, use 1/6 of total daily opioid dose for as required dose.
	Subcutaneous injection	2mg every hour as required	
	Subcutaneous infusion	10 to 20mg over 24h	
Codeine linctus	Oral	60mg every 6 hours as required	
If the patient has known renal impairment (eGFR <30), consider using equivalent and equipotent doses of oxycodone, if immediately available, as required and alfentanil or oxycodone in an infusion..			

Respiratory Secretions			
Suction is not recommended for patients dying rapidly with COVID-19 lung disease. Focus should be on treatment of distress related to secretions, or medical treatment of secretions. Outwith this context, if suction is being used for symptomatic relief in a palliative care setting, an appropriate level of PPE is required.			
Hyoscine Butylbromide	Subcutaneous injection	20mg every hour as required	
	Subcutaneous infusion	Up to 180mg over 24h	
Glycopyrronium	Subcutaneous injection	200micrograms every hour as required	
	Subcutaneous infusion	1.2mg over 24h	
Hyoscine Hydrobromide	Subcutaneous injection	400micrograms every hour as required	
	Subcutaneous infusion	2.4mg over 24h	

REF:

Scottishpalliativeguidelines(https://www.palliativecareguidelines.scot.nhs.uk/guidelines/symptom-control/end-of-life-care-guidance-when-a-person-is-imminently-dying-from-covid-19-lung-disease.aspx)

Terminal delirium / Terminal agitation / Terminal restlessness			
A combination of midazolam and levomepromazine should be considered in terminal agitation/restlessness/delirium.			
Early commencement of syringe pump, if available, is strongly recommended.			
Midazolam	Subcutaneous or slow intravenous injection	Start with 2 to 5mg as required; can be titrated to resolution of symptoms.	• Titration frequency: subcutaneous 10-15mins; intravenous 3-5mins. • Maximum dose 100mg over 24h. • Better for agitation due to distress and anxiety. • Consider using lower doses in elderly patients. • High doses may be required in patients who have severe agitation.
	Subcutaneous infusion	Start with 10 to 20mg over 24h	
Levomepromazine	Subcutaneous injection	Start with 10 to 25mg every hour as required	• Doses over 100mg/day may be given under specialist advice. • Better for agitation due to delirium. • Consider using lower doses in elderly patients.
	Subcutaneous infusion	Start with 50mg over 24h (can be given as bd injections)	
Haloperidol Use where levomepromazine is not available.	Subcutaneous injection	1mg every 2 hours as required.	
	Subcutaneous infusion	Start with 5 to 10mg over 24h	
If the patient remains agitated, please contact your local palliative care team for further advice.			

Pyrexia			
Paracetamol	Oral, rectal or intravenous	1g every 4 to 6 hours; maximum 4g per day	• Use 500mg dose if: o Weight <50kg o Hepatic impairment o History of alcohol excess
Diclofenac	Oral or rectal	75mg to 150mg daily in divided doses	• Dilute in saline
	Subcutaneous or intramuscular injection	50mg every 8 hours as required	
	Subcutaneous infusion	150mg over 24h	
Ketorolac	Subcutaneous infusion	60mg over 24h	• Dilute in saline
	Subcutaneous injection	15mg every 8 hours as required	
Remember non-pharmacological measures such as reducing room temperature, removing excess bedding, and cooling forehead with tepid sponging (if PPE is available).			

Pain
Pain is not a prominent feature of COVID-19 lung disease. Paracetamol may be adequate analgesia in addition to the above medications for other symptoms. If this is not the case, refer to: https://www.palliativecareguidelines.scot.nhs.uk/guidelines/pain.aspx for advice.

17. Paediatrics / Neonates and COVID-19

Dr. Quazi Rezina Naquib, Dr Bandana Rajbhandari Joshi

This is an emerging science and data, evidence and recommendations are undergoing frequent changes, evaluation and update. The following information and management guidelines are collated from the RCPCH UK, DFTB COVID 19 evidence review, KCH London and EKHUFT guidelines.

Summary

Reassure parents and involve them in caring for their child and communicate well with colleagues

Be extra-vigilant in children with pre-existing conditions but reassure parents that the risks of comorbidities is much greater in adults than children

Chest x-rays (CXR), bloods, and blood gases are not routinely indicated in all children. However, these should be monitored in children with persistent fever, altered fluid balance, signs of liver dysfunction, or respiratory failure

Although recommended in some adult papers, the following medical treatments are likely to have more side-effects than beneficial effects in children and are not routinely indicated: bronchodilators, systemic steroids, antibiotics, antivirals, and diuretics.

Despite emerging concern about Angiotensin Converting Enzyme (ACE) Inhibitors and non-steroidal anti-inflammatory drugs (NSAIDs), there is insufficient evidence for stopping this if children have been taking them for pre-existing conditions and such an action may be harmful. In otherwise well children, paracetamol should be taken as the first-line antipyretic, and ibuprofen only taken with caution.

Escalate respiratory support as per local respiratory failure pathways. Do not use high flow nasal cannula oxygen if the child is saturating adequately with low flow oxygen.

A. Introduction:

Vast majority of the children with COVID 19 have self-limiting illness without complications and will only present with mild symptoms. Many symptoms and parameters are different in children compared to adults.

B. Transmission:

Evidence suggests transmission from a child to an adult is low.

C. Clinical presentation:

No symptoms on admission consistently predict the outcome in children.

- The commonest features are fever and/or cough (each around 50%).
- Cough is typically dry (productive sputum in one study-3%). Fever in children with COVID-19 tends to subside within three days.
- Myalgia, lethargy, reduced feeding, coryzal symptoms, sore throat, hoarseness, shortness of breath, rash (vasculitis or chilblain like rash mostly in the foot), irritability, GI symptoms have also been reported.
- Wheeze is uncommon.

D. **Vulnerable groups: (**Much less common in children)

- Solid organ transplant recipients.
- People with specific cancers:
    - people with cancer who are undergoing active chemotherapy
    - people with lung cancer who are undergoing radical radiotherapy
    - people with cancers of the blood or bone marrow such as leukaemia, lymphoma or myeloma who are at any stage of treatment
    - people having immunotherapy or other continuing antibody treatments for cancer
    - people having other targeted cancer treatments which can affect the immune system, such as protein kinase inhibitors or PARP inhibitors
    - people who have had bone marrow or stem cell transplants in the last 6 months, or who are still taking immunosuppression drugs
- People with severe respiratory conditions including severe asthma and severe chronic obstructive pulmonary (COPD), cystic fibrosis.
- People with rare diseases and inborn errors of metabolism that significantly increase the risk of infections (such as Severe combined immunodeficiency (SCID), homozygous sickle cell).
- People on immunosuppression therapies sufficient to significantly increase risk of infection.
- Severe asthma, other long-term respiratory conditions, immunocompromised, Cyanotic or, haemodynamically significant heart disease, Chronic Kidney disease (Parental smoking, poor housing and nutrition may also be associated with severity).

E. Supportive Medical Care

Admission:

Majority of the children with mild symptoms will not require admission.

Do NOT examine oropharynx unless absolutely necessary – if needed, wear full PPE, for suspected acute tonsillitis. If clinically indicated can prescribe antibiotic without examining.

Investigations:

Majority have asymptomatic or mild disease only.

Investigations not routinely required for children with mild-moderate disease requiring only supportive care, beyond those required to exclude alternative diagnoses and/or persistent fever, altered fluid balance, liver dysfunction and respiratory failure.

Alternative diagnoses are to be considered in children presenting as unwell, following the same investigation and management practice and pathways in place prior to the outbreak.

1. **Blood tests**

- **CBC** –Leucopenia common. Lymphocyte count normal or high, Lymphopenia rare.
- **CRP** – may be raised (10% - 20% children, max value reported 33)
- **LFTs** – AST ALT can be raised and may be associated with severe illness, pneumonia and drug treatments. Not routinely checked unless severe illness/indicated.

Please see additional investigations (table) for severely unwell children

2. **Radiology**

- Chest x-rays and CT scans usually show non-specific findings and not routinely indicated unless there is a specific clinical question or requiring oxygen on Day 3 of admission/progressive hypoxemia/ deteriorating/requiring CPAP.
- Portable chest X Rays recommended to minimise movement around the hospital.
- If Lobar collapse, likely to be bacterial pneumonia and not COVID-19. No studies have described lobar collapse, pneumothorax, or effusion in children with COVID-19.
- CT Scans are not helpful with diagnosis or management and are not indicated. Transferring infected children to the CT scanner puts other children at risk.

3. Additional diagnostic tests for severely unwell children (table)

For children presenting/deteriorating with severe features consistent with ARDS

Initial diagnostic tests	
	FBC, U+E, LFT, CRP, Troponin, Ferritin, LDH, coagulation panel including D-Dimer *If considering immunomodulatory treatment send IL6 and soluble CD25
Microbiology	Blood cultures, urine MC&S, viral respiratory panel *HIV testing should be done in all children in whom treatment with lopinavir / ritonavir is being considered, but pending results should not delay treatment
Radiology	Chest x-ray
Other	Serum save, research bloods if appropriate in your setting In children <2 years of age consider lymphocyte subsets to exclude SCID (severe or critical illness only)
Suggested ongoing monitoring tests (if deteriorating patient)	
Haematology / biochemistry	FBC, U+E, LFT, CRP, Ferritin

4. Management

Fluids

- Acute Kidney injury (AKI) is a complication of viral infections.
- Most with mild illness do not require fluid restriction
- Restrict in moderate to severe respiratory compromise to reduce risk of ARDS.
- May need IV fluids in dehydration (due to Pyrexia, Anorexia, Tachypnoea),
- Monitor fluid balance, and measure daily weight if fluid intake is a concern.
- Renal profile blood tests and urine dipstick are not required in all unless there are concerns.
- Diuretics to be considered if worsening respiratory failure requiring CPAP or NIV or if evidence of pulmonary oedema on chest x-ray. (Involve critical care teams early in these cases).

Antipyretics:

- First line- Paracetamol
- Avoid ibuprofen in children with poor fluid intake or suspected AKI.
- If a child is requiring ibuprofen for relief of fever, this may reflect significant inflammation, or be a sign of sepsis, and have a lower threshold for checking blood inflammatory markers..

Antibiotics:

- Not routinely used unless in secondary infection or in alternative diagnosis like Lobar Pneumonia, Sepsis, bacterial infection etc. Antibiotic choice should be based on local guidelines.
- A respiratory sample for microbiological culture should ideally be sent prior to starting antibiotics.
- If CXR shows atypical infection, a macrolide may be indicated.

Respiratory support

- Most children are unlikely to develop respiratory failure.
- Low flow nasal cannula O2 if SpO2 <92% (Target SpO2 92-95%). If hypoxia persists, only then Opti flow /High flow O2 is indicated using appropriate PPE. If persistent hypoxia, increased work of breathing or high FiO2, consider CPAP or, early intubation and ventilation if available.
- Respiratory support not to be used routinely who are otherwise saturating adequately. No evidence of benefit of blood gases and should not be done routinely.
- Capillary blood gases can be used in children who despite administration of HFNC appear to require further respiratory support.

Bronchodilators

- Wheeze uncommon in Covid-19.
- Bronchodilators not to be used routinely unless suspicion of bronchoconstriction: (wheeze and prolonged expiration).
- If acute asthma: salbutamol via Metered dose inhaler (MDI) / Spacers rather nebulisation where possible. Oral steroid should be used as normal in children with asthma attacks.

Systemic Steroids:

- Not to be used routinely as likely to be harmful, prolongs viral shedding and immunosuppressive.

Antivirals and Immunomodulatory treatment

Currently limited evidence of efficacy of antiviral and immunomodulatory therapy for COVID19 in adults, and no evidence in children. The decision to start treatment should be made carefully on a case by case basis. Discussion within already established internal review pathways should be held, but also discussion with an external Paediatric Infectious Disease Specialist prior to starting antiviral therapy and/or a clinician with experience in the use of immunomodulatory therapy if these are being considered (immunology, haematology, bone marrow transplant, rheumatology).

Antiviral treatment is likely to have the most benefit in the first phase of illness. Immunomodulatory therapy may only be indicated if clear evidence of hyperinflammation, or in the second phase of the illness, and evidence is currently extremely limited.

Antiviral treatment and immunomodulatory treatment should be restricted for hospital use only and ***preferably in a clinical trial setting***.

Samples (respiratory and blood) should be sent for virology testing prior to initialising treatment and all patients should be discussed with microbiology/infectious diseases.

For patients in whom treatment with lopinavir/ritonavir (Kaletra) is being considered, an HIV test should be performed to avoid selecting for resistance in an undiagnosed child.

Treatment criteria

Treatment criteria		
Mild to moderate disease No O2 requirement Mild upper airway infection	All groups	Supportive care
Severe disease Mild - moderate ARDS**: 1. Unventilated requiring FiO2 >40% to maintain saturation 88-97% 2. Ventilation: • Oxygenation index: 4 ≤ 16 • Oxygenation saturation index: 5 ≤ 12.3	All groups Risk group*	Supportive care Treatment with antivirals may be considered Treatment with immunomodulatory therapy may be considered if evidence of hyperinflammation (raised CRP, Ferritin, IL6, sCD25)
Critical disease Severe ARDS**: • Oxygenation index ≤ 16 • Oxygenation saturation index: ≤ 12.3 Septic shock Altered consciousness Multi-organ failure	All groups	Supportive care Treatment with antivirals may be considered Treatment with immunomodulatory therapy may be considered if evidence of hyperinflammation (raised CRP, Ferritin, IL6, sCD25)

F. Complications

- Hypoxic Respiratory Failure – Rare only in 5% of symptomatic cases, progressing to ARDS only in 0.6%
- Shock – Rare, in symptomatic children who became critically ill, consider alternate diagnosis.
- Acute Kidney Injury, Myocardial dysfunction, Coagulation Dysfunction - as part of multiorgan dysfunction – Do Not use diuretics in AKI unless there is pulmonary oedema.

Neonates born to COVID Positive Mother

No clear evidence of vertical transmission in neonate. Some cases – IgM +ve but baby remained well. Some babies born preterm, were relatively sicker but swabs were not positive.

Baby if well – to stay with mum. If mum wants to breast feed, advice mum to wear a mask during feeding and hand washing.

If needs resuscitation at birth – please follow local ‘’New born Life Support Protocol’’ – Neonatal Team to follow PPE guideline.

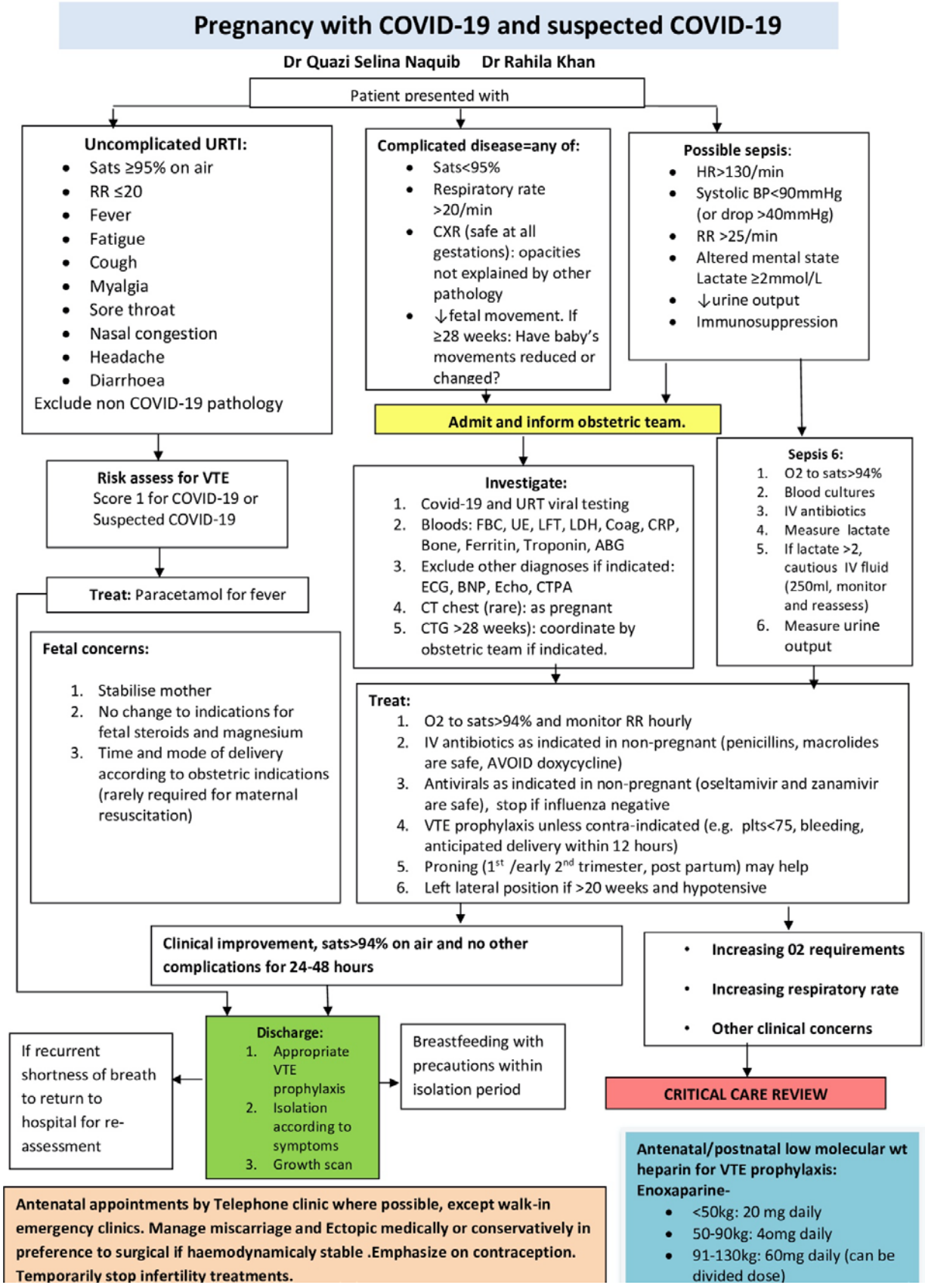
If Preterm or, Unwell, need Neonatal Unit admission – treat accordingly including respiratory support as per local protocol. Need to be isolated. If baby on CPAP or, High Flow or, ventilated – Neonatal Staff needs full PPE.

If on low flow oxygen or, no respiratory support – staff to wear standard PPE

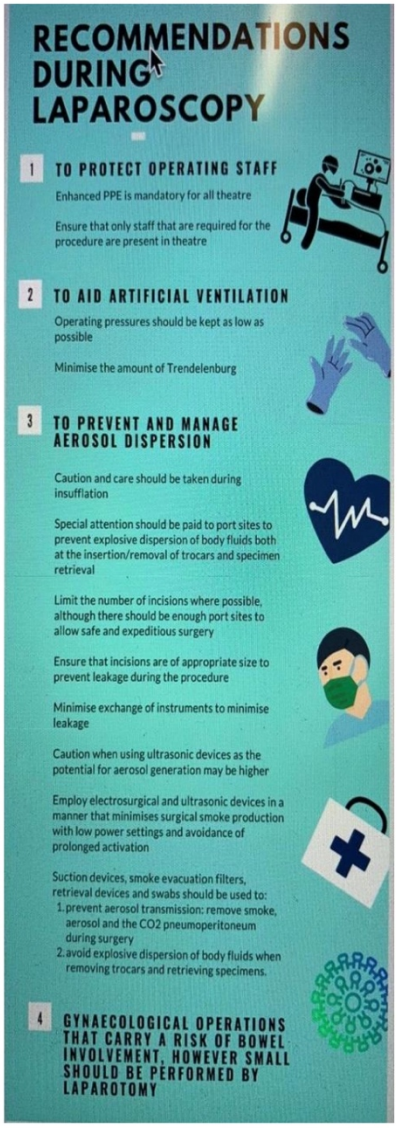
Reference: RCPCH UK, DFTB COVID 19 evidence review, Kings College Hospital, London, EKHUFT guideline

18. Obstetrics, Gynaecology and COVID-19

Dr. Quazi Selina Naquib, Dr. Rahila Khan



OBS &GYNAE Operative procedures and PPE for COVID-19



OBSTRETIC THEATRE	
AGP (general anaesthesia) • If a GA conversion is needed midway through a case: all staff to fit an FFFP3 • For scrubbed staff: pause, remove sterile gloves and carefully fit an FFFP. Then replace sterile gloves. • If safe to do so, whole team apart from anaesthetic team- to step back >2m from patient during intubation • FFFP3 mask • Eye Protection • Long-sleeved gown OR surgical gown • Gloves	**Non- AGP** (regional anaesthesia) The Anaesthetic team will always wear FFFP3 due to the risk of conversions to GA **Anaesthetic team** • FFFP3 mask • Eye protection • Long-sleeved gown OR surgical gown • Gloves **Rest of the MDT** • Surgical mask • Eye protection • Surgical gown OR apron (for non-scrubbed staff) • Gloves
GYNAE THEATRES	
AGP (Aerosol Generating Procedures) All procedures undue GA	**Non AGP- (Office hysteroscopy, MVA, LLETZ, Word catheter for Bartholin's)**
• FFFP3 mask • Eye protection • Long-sleeved gown OR surgical gown • Gloves	• Surgical mask • Eye protection • Long sleeved surgical gown • Gloves
VAGINAL DELIVERY (Normal and Instrumental delivery)	
Use of Entonox (Non AGP)	
• Surgical mask • Eye protection • Apron/Long sleeved gown • Gloves	
NEONATAL TEAM	
Delivery room or Theatres	• Neonatal team awaits outside • If resus is needed wear same PPE as team
ADMIN & CLERICAL AND MANAGEMENT TEAM	
Non-patient facing	**Patient facing**
• No PPE needed	• Surgical mask

The RCOG and Specialist Societies have developed a range of guidance for gynaecological services during the COVID-19 pandemic

The following advice is provided as a resource for UK healthcare professionals and providers based on available evidence, good practice and expert advice.

The priorities are
1. Provision of safe care to women, including those with suspected/confirmed COVID-19.
2. To reduce the risk of person to person transmission of the virus SARS-CoV-2, which causes COVID-19.
3. To make the best use of very limited human and physical resources.

Please be aware that this is very much an evolving situation and this guidance is a living document that may be updated if or when new information becomes available.

Recommendations

1. To withhold all elective gynaecological surgeries including fertility treatment.
2. To have good contraception to avoid pregnancy
3. Only gynaecological emergency surgeries should be carried out.
4. Joint RCOG, BSGE and BGCS guidance for the management of abnormal uterine bleeding (Menorrhagia, Intermenstrual bleeding, Post coital bleeding, Most menopausal bleeding), hysteroscopy and colposcopy in the evolving Coronavirus (COVID-19) pandemic. These are frequent symptoms that raise concerns about gynaecological cancer.

https://www.rcog.org.uk/en/guidelines-research-services/coronavirus-covid-19-pregnancy-and-womens-health/coronavirus-covid-19-and-gynaecological-services/

Summary of the RCOG BSGE and BGCS guidelines:
Heavy Menstrual Bleeding (Menorrhagia)

- Managed by phone consultation. Risk of malignancy is negligible.
- If there are no symptoms of significant anaemia prescribe oral medication (Tranexamic acid/Mefenamic acid/OCP/cyclical Progesterone).
- Patient should be seen for further management if: The HMB is torrential and / or prolonged, resistant to oral treatments, severe anaemia is suspected.
- When seen the patient should have examination and investigations as usual.
- Management for severe HMB may include
    - Oral or i/v iron infusion according to the severity of the anaemia
    - Tranexamic acid and a course of high dose oral progestogens or Mirena IUS(if available)
    - GnRH analogues for refractory bleeding despite medical treatments and / or in the presence of significant uterine fibroids.
    - Consider 3-month course of GnRH analogues or delivery via the nasal route (nafarelin acetate spray). Add-back HRT should be considered, if GnRH analogue treatment is to be continued beyond 3-6 months.

- Endometrial hyperplasia & cancer should be managed according to local protocols & national guidance. Atypical endometrial hyperplasia can be managed with Mirena (if available) or Provera and repeat biopsy in 3 months.

Intermenstrual Bleeding

- Initially managed by telephone consultation. Focus should be on reassurance.
- Clinical history to determine the severity and the likely cause.
- Pregnancy should be excluded.
- If the likelihood of sexually transmitted infection or genital tract cancer is negligible, then
    - Reassure
    - Observation with phone follow up to see if the IMB subsides
    - Change in hormonal contraceptives in current users
    - Trial of hormonal contraceptives in non-users
- Women should only be asked to come for a pelvic examination, if:
    - STD or malignancy is suspected

Postmenopausal bleeding (PMB)

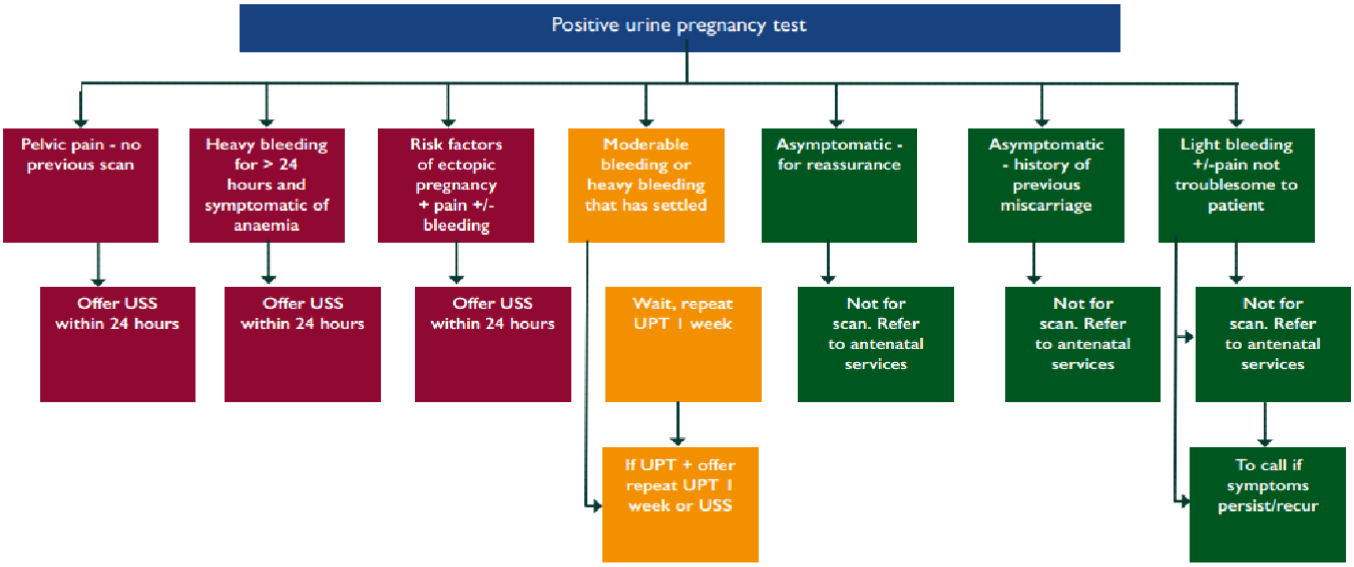
- 5 -10% of women with PMB will have endometrial cancer.
- Initially managed by phone consultation:
    - If they have suspected or confirmed COVID-19, they will not be seen until they are no longer infectious (14 days from the onset of symptoms) to avoid horizontal transmission.
    - Assess whether hospital assessment can be deferred for COVID-19 vulnerable patients. This risk needs to be balanced against the risk of delay in diagnosis of a gynaecological cancer on a case by case basis.
- When seen in clinic
    - A speculum examination should be performed to assess the cervix.
    - Measurement of the endometrial thickness (ET) by transvaginal ultrasound scan (TVS) should be the first line test. If ET is <4 mm the patient can be discharged.
    - If ET is >4mm - Hysteroscopy /endometrial biopsy should be done.
- Hysteroscopy, blind endometrial biopsy and polypectomy using electrosurgical or tissue removal systems do not pose an increased risk of transmission of SARS-CoV-2 to health care workers because the virus has not been identified in the genital tract in women with COVID-19.
- PPE – gloves, surgical mask, eye protection, long sleeved surgical gown.
- Where an inpatient procedure is to be undertaken, consider the use of conscious sedation and regional anaesthesia rather than general anaesthesia to prevent the generation of aerosols.
- Consideration should be given to insertion of a Mirena (if available) at the time of blind endometrial biopsy or hysteroscopy where there is considered a high risk of endometrial hyperplasia or cancer.
- Minimise the number of attendances at health care facilities for women with PMB, by offering TVS, clinical history taking, pelvic examination, hysteroscopy and / or blind endometrial biopsy at the same visit.
- Defer endometrial surveillance for non-atypical endometrial hyperplasia in women without abnormal uterine bleeding because the risk of progression to endometrial cancer is low.
- If cancer is diagnosed - should be referred to a gynaecological oncology for further management.

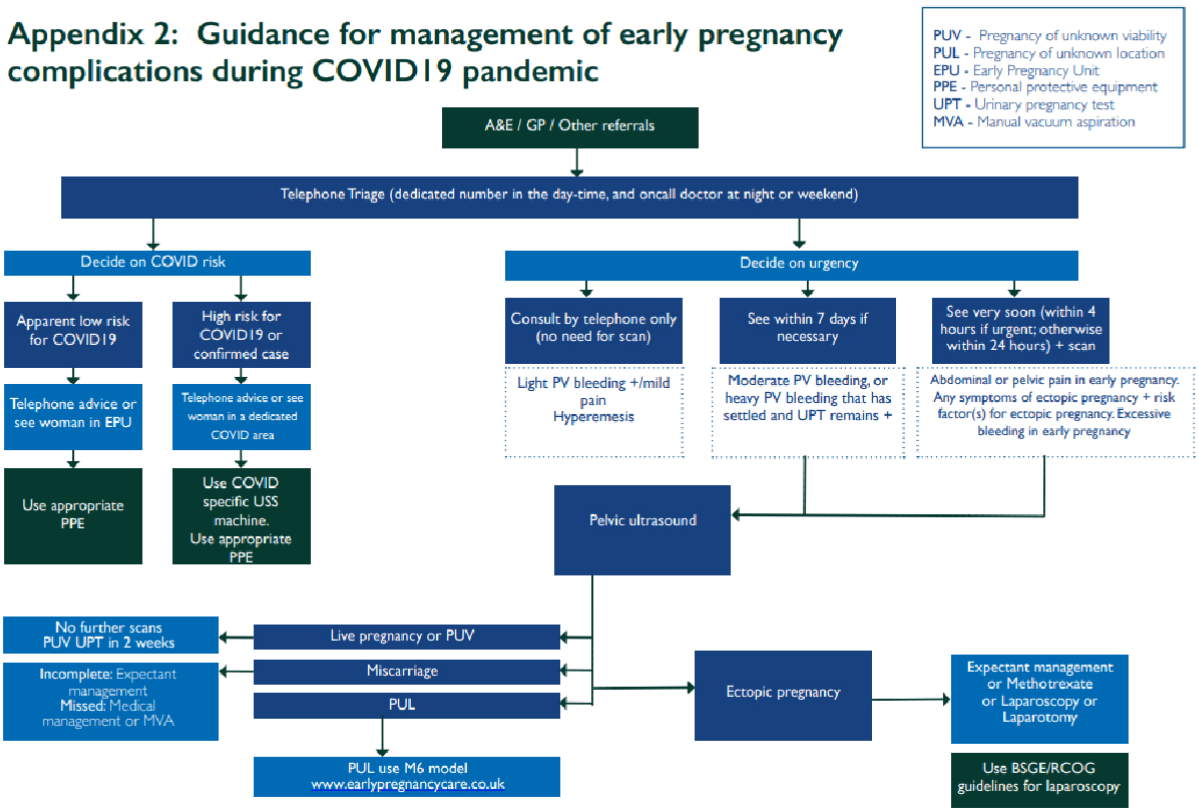
Post coital bleeding

- Women with PCB should initially be managed by phone consultation:
    - Cervical cancer is extremely unlikely if they have an recent negative cervical smear test.
    - If there are any risk factors for a sexually transmitted disease, they should be seen for further investigation and management.
    - If no recent negative cervical smear then she should be seen for speculum exam to exclude cervical cancer and for a smear to be taken.

COVID-19 and Colposcopy

1. In the current COVID-19 crisis, in line with UK screening programme guidance, only women who have had a recent cervical smear suggesting high grade moderate or worse, BNC in endocervical cells or possible glandular neoplasia, or suspicion of invasive disease should be seen for colposcopy.
2. Evidence suggests that the presence of COVID-19 is very low in the lower genital tract and in blood. It is unlikely that smoke produced during a LLETZ procedure will contain COVID-19 virus particles.
3. Cold (thermal) coagulation can be performed.
4. In asymptomatic women: PPE - Gloves, apron and an appropriate mask should be worn for colposcopy face-to-face consultation and examination.
5. Minimum number of staff should be present during procedures.
6. A serviced smoke extractor must be used for any LLETZ procedures.
7. Minimise use of coagulation with diathermy, as this causes greater dispersal of vaporised particles.
8. In women with suspected or confirmed COVID-19 infection (including those who attend with symptoms which may be indicative): defer colposcopy assessment until symptoms resolve or the woman has tested negative.
9. If women have significant symptoms suggestive of cervical cancer and are symptomatic of COVID-19, then the whole colposcopy multi-disciplinary team should wear full personal protective equipment (PPE) during consultation and examination.
10. Given the likely prevalence of asymptomatic carriers of SAR-COV-2, all staff should wear appropriate PPE (gloves, apron, surgical mask) during consultations.





The full guidance for early pregnancy can be found here:

https://www.rcog.org.uk/globalassets/documents/guidelines/2020-04-03-guidance-for-rationalising-early-pregnancy-services-in-the-evolving-coronavirus-covid-19-pandemic.pdf

This refers to all patients irrespective of COVID-19 status (unless stated otherwise)							
	Any Area	High Risk Red Areas*	General Red Area	Green Area	Operating Theatres or 2nd/3rd Stage Vaginal Delivery if no AGPs	Direct Patient Care within Outpatients/ Ambulatory Care	Transferring Patients (via corridors)
	AGP (Single Procedure)	Where AGPs are performed	Not high risk	Direct Inpatient Care (prior to entering bay/side room)			
Hand Hygiene	✓	✓	✓	✓	✓	✓	✓
Gloves	✓ Single Use	✓ Single Use	✓ Single Use	✓ Single Use	✓ Single Use	✓ Single Use	✓ Single Use
Disposable Plastic Apron	✗	✓ Single Use	✓ Single Use	✓ Single Use	✓ Single Use	✓ Single Use	✓ Single Use
Disposable Gown	✓ Single Use	✓ Sessional Use	✗	✗	✓ Single Use	✗	✗
Fluid Resistant Surgical Mask	✗	✗	✓ Sessional Use	✓ Sessional Use	✓ Single or Sessional Use	✓ Single or Sessional Use	✓ Single Use
FFP3 Respirator Mask	✓ Single Use	✓ Sessional Use	✗	✗	✗	✗	✗
Disposable Eye Protection**	✓ Single Use	✓ Sessional Use	✓ Sessional Use	✓ Sessional Use Risk Assess***	✓ Single or Sessional Use	✓ Single or Sessional Use	✓ Single Use Risk Assess***

19. Surgery and COVID-19

Dr Arifa Siddika, Dr Shakil Farid, Dr Md Zaker Ullah, Dr Shahriar Sadek, Dr. Jhumur Pati, Dr. Samia Mubin, Prof Tipu Aziz

Consider the possibility of COVID-19 infection in every patient. Follow national guidelines and apply clinical judgement at high risk clinical environments.

The following advice is essential:

- For your own safety
- To protect your patients and family
- To allow you to continue to treat patients during this crisis

Key recommendations:

1. Patients with acute surgical conditions are our priority. COVID-19 should be sought in any patient presenting acutely or needing emergency surgery. History, COVID-19 testing, and CXR can assist. Any patient undergoing an abdominal CT scan for acute pain as an emergency presentation should have a CT chest at the same time (unless CT chest previously performed within 24 hours). But remember that, current tests for COVID-19, including CXR and chest CT, may be false negative. Many patients in Bangladesh may not have access to CT scan service, in these circumstances, X-ray chest may be considered for COVID screening.

2. Any patient prioritised who has undergone surgical intervention should self-isolate at least 14 days post operatively after discharge from hospital. Patient who has to undergo routine/planned (i.e cancer) surgery must have to self-isolated prior to surgical intervention as well (for at least 7 days, if living alone. However, 14 days is recommended if living with Family) and be assessed for COVID-19 as above. Swab tests for Corona Virus should be conducted 24-48 hours prior to admission wherever possible (routine/planned surgery). For emergency/urgent cases treat as COVID positive until a negative COVID swab has come back.

3. Consider stoma formation rather than primary anastomosis to reduce need for unplanned post- operative critical care for complications like anastomosis leakage.

4. Operating theatres where Aerosol Generating Procedures (AGPs) are regularly performed are considered a higher risk clinical area and full PPE is advised where COVID-19 is possible or confirmed. General anaesthesia is an AGP. Full PPE consists of disposable gloves and fluid repellent gown, eye/face protection and FFP2/3 or N95 mask.

Laparoscopy and all endoscopic procedures are considered to carry some risks of aerosol-type formation and infection and considerable caution is advised. The level of risk has not been clearly defined and the level of PPE deployed may be important. The smoke plume at laparotomy from coagulating instruments may carry some risk.

5. Consider laparoscopic and endoscopic procedures only in selected individual cases where clinical benefit to the patient substantially exceeds the risk of potential viral transmission to surgical and theatre teams in that situation.

6. Where non-operative management is possible and reasonable (such as for early appendicitis and acute cholecystitis) this should be implemented. Appropriate non- operative treatment of appendicitis or open appendicectomy can be alternatives. Some gall bladder operations can be reasonably deferred for several weeks.

7. Ward round: Use of white coat is not recommended due to infection risk. Use of automated machine is recommended for pulse/BP monitoring in order to avoid close patient contact. Single clinician should examine the patient and rest of the team should stay 2 meters (6 ft) away.

8. In theatre:

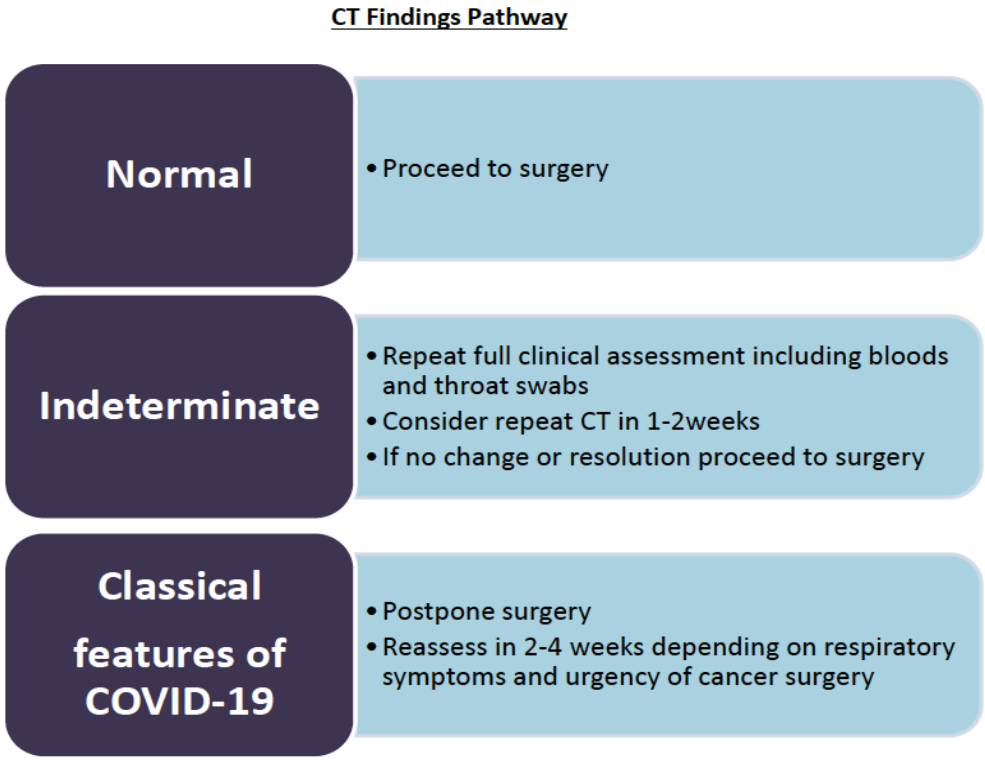
- Minimum number of staff in theatre
- Appropriate PPE for all staff in theatre depending on role and risk
- Smoke evacuation for diathermy / other energy sources
- Team changes will be needed for prolonged procedures in full PPE

9. Endoscopy:

- Only emergency endoscopic procedures should be performed.
- Routine diagnostic work should be avoided.
- Upper GI and lower GI procedures are high risk AGPs and full PPE must be used.

10. Consider the diagnosis and risk of COVID-19 in other situations in Emergency General Surgery and act and use PPE accordingly. Patients of COVID-19 may present with intestinal symptoms and may also present initially as an apparent post-operative complication. Naso-gastric tube placement is an aerosol generating procedure (AGP).

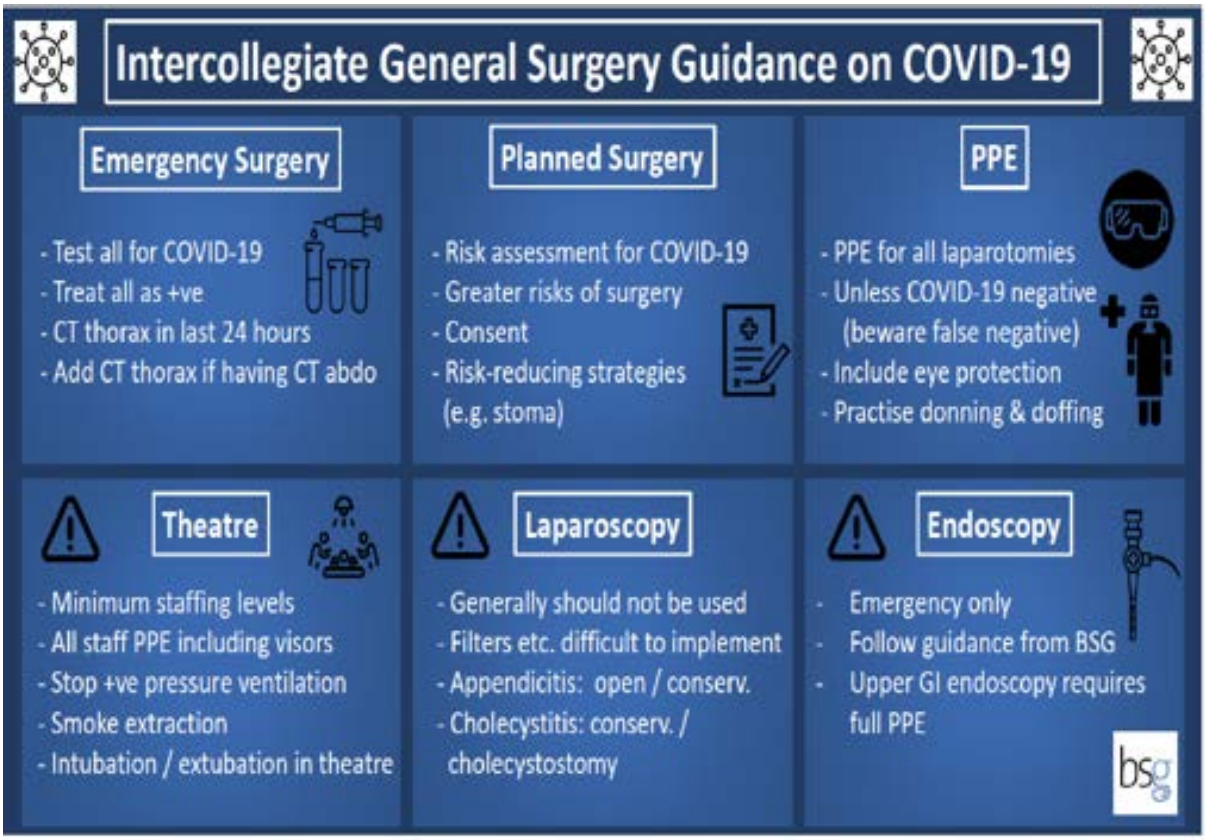
6. CT Chest as screening test for COVID



PPE recommendation at different stages of patient management

Theatre/ AGP* in any area	Ward/ Non AGP*	OPD
• FULL PPE • FFP3/N95 mask • Eye protection • Long-sleeved gown Or Surgical gown (nonpermeable) • Double Gloves	• Close contact (<2m) • Surgical mask • Eye protection • Disposable plastic Apron • Gloves • Non close contact (>2m) • Surgical mask	• Patient with COVID symptoms • Surgical mask • Eye protection • Disposable plastic Apron • Gloves • Patient with no COVID symptoms • Surgical mask

AGP: Aerosol Generating procedures Intubation/Extubation, CPAP, High flow 02, NG tube insertion/removal/endoscopy, bronchoscopy, diathermy, gas insufflation during Laparoscopy, NIV



Summary of Guidance for General Surgery

Clinical guide to surgical prioritisation during the coronavirus pandemic (Royal College of Surgeons)

This guidance by the Royal College of Surgeons describes levels of surgical priority, covering all surgical.

Patients requiring surgery during the COVID-19 crisis have been classified in the following groups:

Priority level 1a Emergency - operation needed within 24 hours

Priority level 1b Urgent - operation needed with 72 hours

Priority level 2 Surgery that can be deferred for up to 4 weeks

Priority level 3 Surgery that can be delayed for up to 3 months

Priority level 4 Surgery that can be delayed for more than 3 months

Clinical guide to surgical prioritisation during the coronavirus pandemic: (modified for Bangladesh)

General Surgery and Urology

Priority Level		Procedure
1a	**<24h**	• Emergency laparotomy (peritonitis/ perforation/ ischaemia/ Necrotising fasciitis) • Emergency laparotomy - bleeding not responding to endoscopic/ interventional radiology • Appendicectomy - complicated/ unresponsive to conservative Rx appendicitis • Intra-abdominal trauma which cannot be managed conservatively • Laparotomy for post operative complications (eg anastomotic leaks/ bleeding) • Drainage of localised sepsis/ necrosis if not responding to conservative Rx (antibiotics/ Interventional radiology) • Benign Perforated oesophagus/ stomach - with survivable mediastinitis/ peritonitis • Acute airway obstruction - thyroid • Acute Scrotal Exploration (suspected Testicular Torsion) • Renal Obstruction with infection - not responding to Conservative Rx
1b	**<72h**	• Laparotomy - small bowel obstruction not responding to conservative Rx • Laparotomy - colectomy for acute severe ulcerative colitis not responding to conservative Rx • Laparotomy - bowel obstruction not suitable for stenting. • Perianal abscess/ other infection - not responding to conservative Rx. • Urgent enteral nutrition access • Failed conservative management of localised intra peritoneal infection • Breast sepsis - without necrosis unresponsive to conservative Rx • Upper GI endoscopy for foreign body removal • Drainage of obstructed renal tract • Malignant tumour or Lymph node biopsy • Pyloromyotomy • Resection of Posterior Urethral Valves • Peritoneal Dialysis Catheter Insertion

2	< 4 weeks	• Crohn's disease - stricture/fistula/ optimise medication/nutrition. • MDT Directed hepatobiliary/ pancreatic/ oesophagogastric cancer causing obstruction (biliary/ bowel). • Goitre - mild moderate stridor • MDT Directed thyroid/parathyroid cancer surgery • Thyrotoxicosis - Not responding to conservative Rx. (including orbital surgery for impending sight loss) • Parathroidectomy - calcium >3.0mmol/l and/or not responding to conservative Rx, especially pregnancy/post-transplant/repeated admission. • MDT Directed breast cancer resection - ER negative/Her2+/ pre-menopausal ER+ with adverse biology • Circumcision for severe BXO • Renal transplant • Renal Stent Removal/Exchange
3	<3 months	• MDT directed resection of colon cancer • MDT directed resection of rectal cancer • MDT Directed hepatobiliary/ pancreatic/ oesophagogastric/ GI Stromal tumour cancer surgery • MDT Directed thyroid cancer surgery - including diagnostic lobectomy. • Renal stones - symptomatic, including sepsis not responding to conservative Rx • MDT directed adrenal resections - intermediate masses • a) >4cm<6cm) with hypersecretion (Cortisol/androgen) • b) metastases - progressing on scan at 3/12. • MDT directed breast cancer resection - pre-menopausal ER+ without adverse biology • Cholecystectomy - post acute pancreatitis • Hernia - presenting with complications that have settled with conservative Rx • Parathroidectomy - - symptomatic renal stones/Sepsis not responding to conservative Rx

4	>3 months	• All uncomplicated hernias including hiatus/incisional hernia. • Abdominal wall reconstruction • Hartmann's reversal • Ileostomy closure • Rectal prolapse • Other proctology procedures • Transanal/resection of benign rectal polyps. • Salvage surgery for recurrent anal cancer • Pelvic exenteration • Multi-visceral/liver resection - not responding to conservative Rx • Cholecystectomy - after biliary colic/ cholecystitis. • Oesophagogastric reflux surgery • Other benign upper UGI conditions (eg gallstones/other Benign disease). • Other benign thyroid/parathyroid disease - uncomplicated • Other adrenal disease - uncomplicated • MDT directed breast cancer resection (post-menopausal ER+) • All benign breast surgery including risk reducing surgery. • Orchidopexy for Un- Descended Testis • Hypospadias repair • Pyeloplasty for Pelvi-Ureteric Junction obstruction • Surgical treatment of Vesico-ureteric reflux • Bladder Augmentation

Orthopaedic, ENT , Neurosurgery and Plastic surgery guideline

Priority Level		Procedure: Orthopaedic
1a	**<24h**	• Fractures - Open/ Neurovascular compromise/Sk in compromise/ Long Bone/Pelvis/Spi ne/Hip • Septic arthritis- natural/prosthetic joint • Dislocated joints • Compartment syndrome
1b	**<72h**	• Unstable articular fractures that will result in severe disability with conservative Rx • Pelvis fractures- unstable • Tibial fracture - high energy/displaced, unstable shaft. • Pathological fracture • Lower limb frailty fractures (non-hip) - requiring fixation for early mobilization

2	< 4 weeks	• MDT Directed Sarcoma surgery - any site • Solitary metastasis surgery - any site. • MDT Directed destructive bone lesion surgery with risk of fracture (e.g Giant cell tumour) • Fractures - displaced, intra- articular/peri- prosthetic/ osteochondral defect/Ankle/Foot/ olecranon/Not Otherwise Specified • Knee extensor disruption (including fractured, displaced patella) • Tendon rupture - hamstring/displaced Achilles/rotator cuff • Locked joints - any site • Nerve Decompression - any site (pain not responding to conservative Rx) • Arthroplasty - lower limb (where delay will prejudice outcome)
3	<3 months	• Hip Avascular Necrosis (night pain/ collapse of the joint/ going off their feet) • Frozen shoulder - severe and not responding to conservative Rx • Tendon reconstruction/ tenodesis - biceps/ hamstring • Revision surgery for loosening/impending fracture. • MDT Directed Benign bone/soft tissue lesion excision biopsy - not otherwise specified • MDT Directed primary sarcoma plus metastases surgery • Arthroscopic removal of joint loose body (Reversible symptoms preventing work) • Locked Knee - ACL/ other reconstruction
4	>3 months	• Arthroplasty/ arthrodesis - not otherwise specified, • Hand and Upper limb surgery - Not otherwise specified • Metal ware removal

References:

1. Public Health England – PPE guidance. Version 2nd April 2020 https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control
2. https://www.rcseng.ac.uk/coronavirus/joint-guidance-for-surgeons-v1/
3. https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/03/specialty-guide-orthopaedic-trauma-and-coronavirus-v1-16-march-2020.pdf

20. Anaesthesia and COVID-19

Dr. Quazi Siddiqui, Prof AKM Akhtaruzzaman

As the number of people infected with SARS Cov-2 grows, more and more patients with active or suspected infection will attend the operating theatre for emergency and urgent operative procedures requiring anaesthesia. A well planned and rehearsed team is essential for these patients to ensure staff and patient safety. We endeavour to provide a framework by which anaesthesia departments in resource-limited countries could prepare themselves to provide safe anaesthesia service in this crisis. We strongly recommend regular rehearsal and training of the relevant staff for a smooth implementation of these measures.

The national and local health service authorities should consider stopping non-urgent surgeries before pandemic peak to enable physical distancing, to allow the departments to prepare and to conserve personal protective equipment.

Airborne Precautions vs Droplet Precautions and OT Room Management

Airway manoeuvres such as mask ventilation and intubation may generate aerosols increasing the risk of virus transmission[1]. Therefore, regional anaesthetic techniques should always be considered as the risk of transmission is relatively low and droplet precaution is adequate. This article is focused mainly on the general anaesthesia provision as airborne precaution is applicable. Depending on the anaesthetic technique used, specific team member may need standard, Droplet PPE or Airborne PPE as mentioned in the team section.

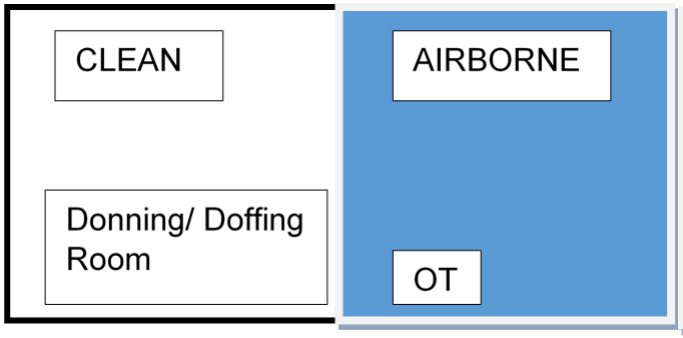
Standard OT precaution and hygiene: Disposable gloves, mask, hand hygiene

Droplet PPE: Disposable gloves, Disposable impervious gown, surgical mask, eye protection[2]

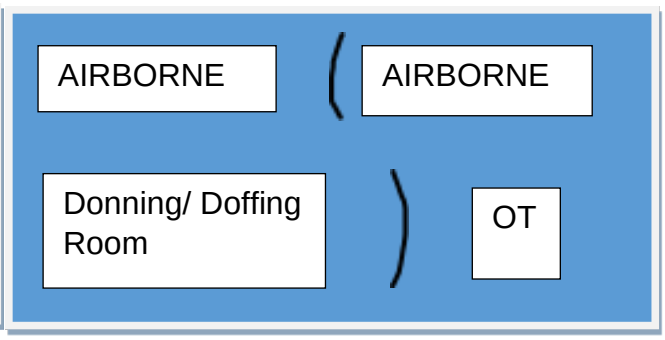
Airborne PPE: Disposable gloves, Disposable impervious gown, N95/P2 mask, eye protection

While donning of PPE could be done in a clean space or change room, doffing should be done in a closed room preferably adjacent to the OT room. Below are examples of room arrangements and requirements for specific precautions when doors are open or close. When OT room needs airborne precaution for aerosol generating procedures, opening door causes the same requirement in adjacent room which is different in droplet precaution.

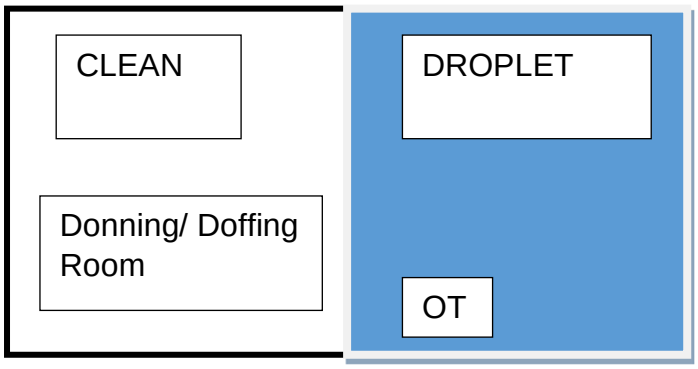
AIRBORNE PRECAUTIONS



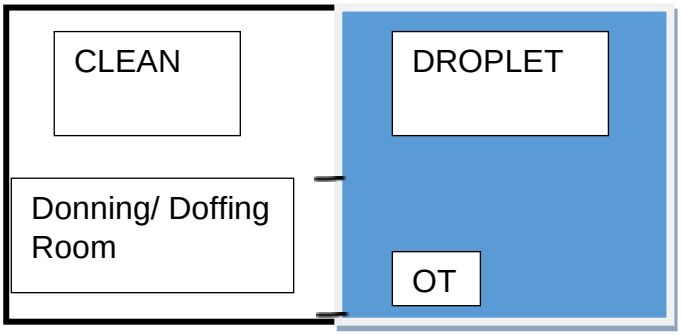
DOOR OPEN AIRBORNE PRECAUTIONS



DOOR CLOSED DROPLET PRECAUTIONS PRECAUTIONS



DOOR OPEN DROPLET



The Team

Theatre team should be comprised of minimum number of essential personnel. However, several associates are required standby outside while OT room doors are kept closed. One designated person should be looking through the glass window to take any signal from inside the room. The OT team should be self-sufficient with the equipment required before the start of the procedure and the door should only be opened in exceptional circumstances once the patient is inside. The requirement for PPE protection changes outside the room if the door is opened depending on the presence of aerosol generating procedure (AGP).Local infection control team should be consulted to determine the time required for the room to be downgraded from airborne to droplet precaution after AGP but generally, in the absence of negative pressure, a 10 minutes pause is deemed to be adequate.

Nursing Team:

Inside scout – airborne non-sterile PPE

Outside scout – standard precaution and hygiene

Scrub nurse – airborne sterile PPE

Anaesthetic Team:

Anaesthetist one – non-sterile airborne PPE

Anaesthetist two – non-sterile airborne PPE

Inside anaesthetic nurse – non-sterile airborne PPE

Outside anaesthetic nurse – standard precaution and hygiene

Surgical Team:

Surgeon – sterile airborne PPE

Surgical assistant (if required) – sterile airborne PPE

Recovery Team:

Recovery nurse – standard precaution and hygiene

Ward Team:

Ward nurse – non-sterile droplet PPE

Porter – non-sterile droplet PPE

Step 1 The Huddle (Nursing, anaesthetic, surgical and recovery teams, and the porter)

Goals

- To inform the case, urgency and rationale for proceeding with the case
- To introduce the team and assign roles of individuals
- To ensure availability of a complete list of equipment and drugs required
- To address concerns raised by the team
- Identify the spotter for donning and doffing

Tasks

- The team introduces themselves
- The four teams take turns to ensure availability of the equipment they need. Theatre nursing team then calls the ward to prepare the patient

STEP 2 Prior to going to OT room

Goals

- Get ready for theatre and for your shower afterwards

Tasks

- Visit the washroom
- Change into OT clothing
- Make up your own named shower bag containing a towel and a fresh OT dress

Step 3 Go to Operating Theatre (Nursing and anaesthetic team, and the porter)

Goals

- Get drugs and equipment ready for anaesthesia and surgery

Tasks

- Anaesthetic team: check machine, prepare drugs and airway Equipment
- Nursing team and the porter: prepare surgical and positioning equipment

Step 4 The First Donning

Goals

- Donning of the anaesthetic and nursing team observed by spotter

Tasks

- Outside scout or outside anaesthetic nurse to act as spotter
- Inside scout, scrub nurse, inside anaesthetic nurse, anaesthetist one and anaesthetist two to Don

Step 5 Calling and receiving the Patient

Goals

- Seamless transfer and reception of the patient in the OT

Tasks

- When the teams inside are ready, outside scout to call for Patient
- Any COVID-19 infected or suspected patient must always wear a surgical mask and patient records must always be covered in a plastic bag
- Inside anaesthetic nurse to go to OT main entrance to receive the patient after appropriate handover from the ward nurse
- Surgical team to stay outside the OT room for WHO Checklist

Step 6 Patient Arrival at the OT room

Operating Theatre is on Droplet Precautions

Goals

- Complete the WHO surgical safety checks
- Gain anaesthetic history and consent if not already done

Tasks

- Outside anaesthetic nurse collects patient notes to be kept outside the OT room
- After the patient is transferred on the OT table, inside Anaesthetic nurse calls outside team on speaker phone, and completes WHO surgical safety checklist
- Anaesthetist completes history and gains verbal consent

Step 7 Intubation

Operating Theatre is on Airborne Precautions

Goals

- To intubate the patient maintaining patient and staff safety

Tasks

- Ensure only inside anaesthetic team and inside scout in room. Outside anaesthetic nurse observes the proceedings through the window and standby for any emergency
- Intubation is performed with appropriate airborne precaution

Step 8 The Third Donning and 10 Minute Wait

Operating Theatre is on Airborne Precautions

Goals

- Wait for operating theatre to return to droplet precautions
- Sterile donning of surgeon and assistant

Tasks

- Surgical team to do sterile PPE donning with outside scout as spotter
- No further activity for10 minutes since the intubation to go to droplet precaution

Step 9 Surgical Team Arrival and Patient Preparation

Operating Theatre is on Droplet Precautions

Goals

- Confirmation of the surgical equipment by surgical team
- To prepare patient for surgery

Tasks

- Surgical team enters the operating theatre and reviews equipment with scrub nurse, outside scout standby to get any missing items
- Time out then to be initiated by inside scrub nurse with outside scrub being on the speaker phone to cross check the patient identity and consent in the notes
- Patient to be positioned, prepped and draped

Step 10 Surgery

Operating Theatre is on Droplet Precautions

Goals

- Proceed with surgery
- Complete Surgical Count
- Prepare Patient for Extubation
- Surgical Team to Exit

Tasks

- Surgery to proceed
- At the completion of procedure, surgical count and sign out check to be recorded via speaker phone with outside scout (equipment count list outside)
- Scrub nurse to clean equipment
- Surgeon or surgical assistant to assist with transferring intubated patient to bed
- Surgical team to then doff through doffing room spotted by outside scout

Step 11 Extubation

The Operating Theatre is on Airborne Precautions

Goals

- To safely extubate the patient
- To inform ward that recovery of patient has begun

Tasks

- Outside anaesthetic nurse to stay standby at the window for any emergency
- Extubation to commence when all team members standing behind the patient
- Anaesthetist to apply surgical face mask and Hudson mask over it after extubation
- From the time of mask application, the room remains airborne for 10 minutes
- Outside scout to inform recovery and the ward at this point.
- After 10 minutes from extubation, the room is on droplet precautions

Step 12 Patient Recovery

The Operating Theatre is on Droplet Precautions

Goals

- Safe doffing of anaesthetist one and anaesthetist two
- Recovery of patient
- Inform ward that transfer of care is required

Tasks

- Anaesthetist one and two to doff spotted by outside anaesthetic nurse
- Anaesthetist one finished tasks but should be available for recovery enquiries
- Recovery nurse and inside anaesthetic nurse stay for patient recovery
- When patient is ready for ward, recovery nurse to inform the ward

Step 13 Clean Up

Operating theatre is on Droplet precautions

Goals

- Clean and prepare OT for next case

Tasks

- Inside nurse team to doff via doffing room self-spotting
- Cleaner to don with droplet precaution in donning room
- Clean OT and doff afterwards with self-spotting

References:

1. Ferioli M, Cisternino C, Leo V, et al. Protecting healthcare workers from SARS-CoV-2 infection: practical indications. Eur Respir Rev 2020; 29: 200068 [https://doi.org/10.1183/16000617.0068-2020]
2. Bartoszko J, Farooqi M,Alhazzani W, Loeb M. Medical masks vs N95 respirators for preventing COVID-19 in healthcare workers: A systematic review and meta-analysis of randomized trials. Influenza Other Respir Viruses. 2020;00:1–9
3. https://multimedia.3m.com/mws/media/1816576O/disinfection-of-disposable-respirators-technical-bulletin.pdf
4. https://www.sages.org/n-95-re-use-instructions/
5. Correspondence posted by Dr. Amanda Deskins on March 23, 2020 in the following JAMA Editorial: https://jamanetwork.com/journals/jama/fullarticle/2763590

21. Mental health and COVID-19

Dr Shama Parveen

During the current COVID 19 crisis, the whole world is facing an unprecedented situation. It means that life is changing for all of us for a while. It may cause you to feel anxious, stressed, worried, sad, bored, lonely, or frustrated. There are some simple things you can do to help you take care of your mental health and wellbeing.

1. **Look after your physical well-being -** Our physical health has a big impact on how we feel. At times like these, it can be easy to fall into unhealthy patterns of behaviour that end up making you feel worse. Eating regularly and keeping your blood sugar stable can help your mood and energy levels. Try to eat healthy well-balanced meals, drink enough water and exercise regularly. Also look after your sleep by maintaining a daily sleep routine and good sleep hygiene.
2. **Continue to have treatment:** If you are suffering from a mental illness, continue to have treatment and support unless your doctor has advised you otherwise. You may need to use alternative ways of accessing professional advice, for example, by telephone or video consultation.
3. **Stay connected with people:** Maintaining healthy relationships with people we trust is important for our mental wellbeing. You could try phone calls, video calls or social media instead of meeting in person
4. **Talk about your worries:** It is normal to feel a bit worried, scared or helpless about the current situation. Remember: it is OK to share your concerns with others you trust – and doing so may help them too.
5. **Support and help others:** Helping someone else can benefit you as well as them, so try to be a little more understanding of other people's concerns, worries or behaviours at this time. Try to think of things you can do to help those around you.

6. **Manage your media and information intake:** 24-hour news and constant social media updates can make you more worried. If it is affecting you, try to limit the time you spend watching, reading, or listening to media coverage of the outbreak. Gather high-quality information that will help you to accurately determine your own or other people’s risk of contracting coronavirus. Think about how possibly inaccurate information could affect others too. Try not to share information without fact-checking against credible sources.
7. **Think about your new daily routine:** Think about how you can adapt and create positive new routines – try to engage in useful activities (such as cleaning, cooking or exercise) or meaningful activities (such as reading or calling a friend).
8. **Do things you enjoy:** Focussing on your favourite hobby or learning something new can give you some relief from anxious thoughts and feelings and can boost your mood.

9. **Set goals:** Setting goals and achieving them gives a sense of control and purpose. Think about things you want or need to do that you can still do at home. It could be watching a film, reading a book or learning something online.
10. **Keep your mind active:** Read, write, play games, do crossword puzzles, sudokus, jigsaws or drawing and painting. Find something that works for you.
11. **Take time to relax and focus on the present:** This can help with difficult emotions, worries about the future, and can improve wellbeing. Relaxation techniques can also help some people to deal with feelings of anxiety. For useful resources see Every Mind matters and NHS' Mindfulness page
12. **If you can, once a day get outside, or bring nature in:** Spending time in green spaces can benefit both your mental and physical wellbeing. Please follow your local guidance about going out of the house. If you cannot get outside much you can try to still get these positive effects by spending time with the windows open to let in fresh air and get some natural sunlight.
13. **People with learning disability, autism and other developmental disorders: It is important that people with learning disability, autism and other developmental disorders understand the change around them and supported appropriately during this difficult time.** Public Health England, Mencap and Learning Disability England websites has easy read guidance on coronavirus (COVID-19) and how it may affect you.

References:

3. GOV.UK

4. NHS Every Mind Matters

5. NHS mental health and wellbeing

6. Mind, UK

22. Mental health of health care professionals and COVID-19

Dr Tahmina Haque, Dr Sharmin Afroz Panna

It is natural for us to feel anxious, scared, confused, anxiety around the uncertainty, stress of exposing ourselves and family at risk during this unprecedented times. Many of us may have to face “moral dilemma” for not being able to help loved ones during their illness; the dilemma of putting family at risk vs not fulfilling “professional commitment”; the self-imposed critics of not being able to work in front line due to various circumstances; experiencing hurtful comment from media and lay people. Health care professionals are also at risk of suffering from “Moral Injury” for not being able to offer adequate treatment due to lack of resource. The feelings of “constantly losing the battle”; seeing unprecedented will have impact on us are severe than we usually acknowledge.

Moral trauma can lead to mental health problem such as Depression, PTSD.

The points mentioned below been developed following guidelines advised by WHO, Royal College of Psychiatrist UK, American Psychiatrist Association, WAPA and the practical support currently being used in various health organisation in UK.

Key points:

1) **Take care of yourself**

- Take regular breaks and find time to unwind between shifts.
- Get enough sleep (7-8 hours); Eat enough healthy to ensure adequate nutrition; Exercise regularly.
- Avoid using tobacco, alcohol and drugs to cope/self-medication

2) **Be kind to yourself**

- Make room for your feelings - feeling upset or worried is not a sign of weakness.
- Talk to people that you trust, try those strategies that helped you when you had stress in the past.
- Seek help proactively if you struggle. (this is extremely important!)

3) **Stay connected**

- Keep in touch with family and friends – by phone or social media if necessary.
- It would be likely that some of us will experience avoidance by some close ones, or the community due to stigma or fear. Stay connected with your loved ones including through digital methods. Check how your colleagues are doing and support each other. Recognise that different people will cope in different ways.
- If possible, consider setting up or joining a Balint Group to discuss difficult cases and find support from your peers. This may be operated virtually using e-mail, phone, Skype etc. whilst maintain social distancing. (We are happy to support/guide you in this aspect)

4) **Manage information**

- Too much information can be overwhelming. Keep work-related COVID updates to key times.
- Take breaks from watching, reading or listening to news.
- Obtain information from trusted sources and focus on facts not speculation

Reference:

https://www.rcpsych.ac.uk/about-us/responding-to-covid-19/responding-to-covid-19-(guidance-for-clinicians/wellbeing-and-support/your-wellbeing).

https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/

https://www.who.int/emergencies/diseases/novel-coronavirus-2019

https://www.epi-win.com/

https://www.epi-win.com/sites/epiwin/files/content/attachments/2020-02-

https://interagencystandingcommittee.org/other/interim-briefing-note-addressing-mental-health-andpsychosocial-aspects-covid-19-outbreak

23. Cancer and COVID-19

Dr Zahed Khan

In the context of a pandemic outbreak cancer services and professionals need to respond with a prioritisation plan to minimise risks to cancer patients from the treatment-related complications as well as reduce exposure risk to COVID-19 for both patients and health care providers. There could be reduced capacity due to increased staff sickness/absence or supply limitations.

Key points in ensuring the safety of both cancer patients and health care providers. –

1. Prioritising treatments according to clinical benefit and offering those treatments with higher clinical benefit.
2. Modifications of treatment protocols.
3. Modification of provider-patients interactions.
4. Risk-stratification of the clinical areas.

Key point: Priority Category for chemotherapy

Priority level 1	Curative therapy with a high (>50%) chance of success. Adjuvant (or neo) therapy which adds at least 50% chance of cure to surgery or radiotherapy alone or treatment given at relapse
Priority level 2	Curative therapy with an intermediate (20- 50%) chance of success Adjuvant (or neo) therapy which adds 20 – 50% chance of cure to surgery or radiotherapy alone or treatment given at relapse
Priority level 3	Curative therapy of a low chance (10 – 20%) of success Adjuvant (or neo) therapy which adds 10 – 20% chance of cure to surgery or radiotherapy alone or treatment given at relapse Non-curative therapy with a high (>50%) chance of >1 year of life extension
Priority level 4	Curative therapy with a very low (< 10%) chance of success Adjuvant (or neo) therapy which adds less than 10% chance of cure to surgery or radiotherapy alone or treatment given at relapse Non-curative therapy with an intermediate (15-50%) chance of > 1year life extension
Priority level 5	Non-curative therapy with a high (>50%) chance of palliation / temporary tumour control but < 1 yr life extension
Priority level 6	Non-curative therapy with an intermediate (15-50%) chance of palliation / temporary tumour control and < 1 yr life extension

Key point: Priority category for radiotherapy

Priority level 1	Patients with category 1 (rapidly proliferating) tumours currently being treated with radical (chemo)radiotherapy with curative intent where there is little or no scope for compensation of gaps. Patients with category 1 tumours in whom combined External Beam Radiotherapy (EBRT) and subsequent brachytherapy is the management plan and the EBRT is already underway. Patients with category 1 tumours who have not yet started and in whom clinical need determines that treatment should start in line with current cancer waiting times.
Priority level 2	Urgent palliative radiotherapy in patients with malignant spinal cord compression who have useful salvageable neurological function.
Priority level 3	Radical radiotherapy for Category 2 (less aggressive) tumours where radiotherapy is the first definitive treatment. Post-operative radiotherapy where there is known residual disease following surgery in tumours with aggressive biology.
Priority level 4	Palliative radiotherapy where alleviation of symptoms would reduce the burden on other healthcare services, such as haemoptysis.
Priority level 5	Adjuvant radiotherapy where there has been compete resection of disease and there is a <20% risk of recurrence at 10 years, for example most ER positive breast cancer in patients receiving endocrine therapy. Radical radiotherapy for prostate cancer in patients receiving neo-adjuvant hormone therapy.

Key point 1: Modifications to treatment protocols

Idea is to reduce the infection risk for patients, reduce interactions with healthcare providers and best use of resources. Examples include –

1. Consider prophylactic GCSF when not normally used with certain regimes (NS risk 10-20%)
2. Consider reducing the duration of adjuvant therapy or not offering adjuvant therapy in low recurrence risk situations (Breast, Colorectal, lung).
3. Rationalising peri-operative chemotherapy (choosing either neoadjuvant or adjuvant chemotherapy in OG cancer, CRC liver metastasectomy)
4. Using chemoradiotherapy options over resection surgery where possible (like in OG cancer).
5. Switching intravenous treatments to subcutaneous or oral alternatives (IV vs SC Herceptin)
6. Using shorter treatment regimens
7. Decreasing the frequency of immunotherapy regimens, i.e., moving to 4 or 6-weekly
8. Repeat prescriptions of oral medicines or other at-home treatments without patients needing to attend hospital
9. Deferring bone-targeted treatments
10. Using treatment breaks for long-term treatments (possibly for longer than 6 weeks).
11. Rationalising palliative radiotherapy when pain can be reasonably managed with analgesia.

Key point 2: Modification of provider-patients interactions.

1. Telephone/video consultation for all patients and only offer face to face consultation when clinically necessary.
2. Telephone helpline/triage for unwell patients before attending hospital.
3. Dedicated areas for face to face assessment for unwell patients (see key point 4).
4. Reduce family members attending/visiting the patient.
5. Using home delivery services for medicines
6. Introducing drive-through pick-up points for medicines

Key point 3: Risk-stratification of the clinical areas

1. Re-designating outpatients and in-patients into High risk, intermediate and low risk (Red, Amber, Green)
2. Redesigning and controlling the flow of patients and staff between different risk areas.
3. One way flow separating entry and exits.
4. Signposting of different areas with information on appropriate PPE according to risk

Reference:

1. NHS Clinical guide for the management of non-coronavirus patients requiring acute treatment: Cancer 23 March 2020 Version 2
2. COVID-19 rapid guideline: Delivery of Systemic Anticancer Treatments. Published: 20 March 2020. www.nice.org.uk/guidance/ng161

Interim treatment change options for the COVID-19 pandemic, endorsed by NHS England (20 April 2020)

24. Guidance on CPR in COVID-19 in acute hospital settings

Dr Ashrafun Nessa

To asses any patients with a COVID-19 like illness or confirmed case clinician should be in at least Level 2 Personal Protective Equipment (PPE) which includes disposable gloves , disposable apron, Fluid resistant surgical mask, disposable eye protection. For Full Aerosol Generating Procedure (AGP) Personal Protective Equipment (PPE) must be worn by all members of the resuscitation/emergency team before entering the room which includes disposable gloves, disposable gown, filtering face piece (FFP3) respirator and disposable eye protection for CPR or airway intervention.

1. To recognise cardiac arrest look for the absence of signs of life and normal breathing. Feel for a carotid pulse. **Do not listen or feel for breathing by placing your ear and cheek close to the patient's mouth**.

2. When calling for help, state the risk of COVID-19.

3. If a defibrillator is readily available defibrillate shockable rhythms rapidly prior to starting chest compressions or the staff outside the room can pass on the defibrillator. Simple oxygen mask can be left on the patient's face. Restrict the number of staff in the room (if a single room). Allocate a gatekeeper to do this.

4. The cardiac arrest team should be in Level 3 PPE to start proper CPR. If first responder is in level 2 PPE, S/he should leave the room and don level 3 PPE before participating in CPR. **Do not do mouth-to-mouth ventilation or use a pocket mask**.

5. Airway interventions (e.g. supraglottic airway (SGA) insertion or tracheal intubation) must be carried out by experienced individuals. Advice to use video Laryngoscope.

6. Identify and treat any reversible causes (e.g. severe hypoxaemia) before considering stopping CPR.

7. Contact senior help and involve ICU colleagues as part of the planning.

8. Dispose of, or clean, all equipment used during CPR following the manufacturer's recommendations and local guidelines. Remove PPE safely to avoid self-contamination and dispose of clinical waste bags.
9. **Hand hygiene has an important role in decreasing transmission. Thoroughly wash hands with soap and water; alternatively, alcohol hand rub is also effective.**

10. Post resuscitation debrief is important and helps to identify room for improvements.

Patients with a COVID-19 like illness, who are at risk of acute deterioration or cardiac arrest, should be identified early. Patients for whom a 'do not attempt cardiopulmonary resuscitation' (DNACPR) and/or other similar decision is appropriate should also be identified early.

For more information, please view the info graphic and flowchart on the resuscitation

https://www.resus.org.uk/_resources/assets/attachment/full/0/36100.pdf

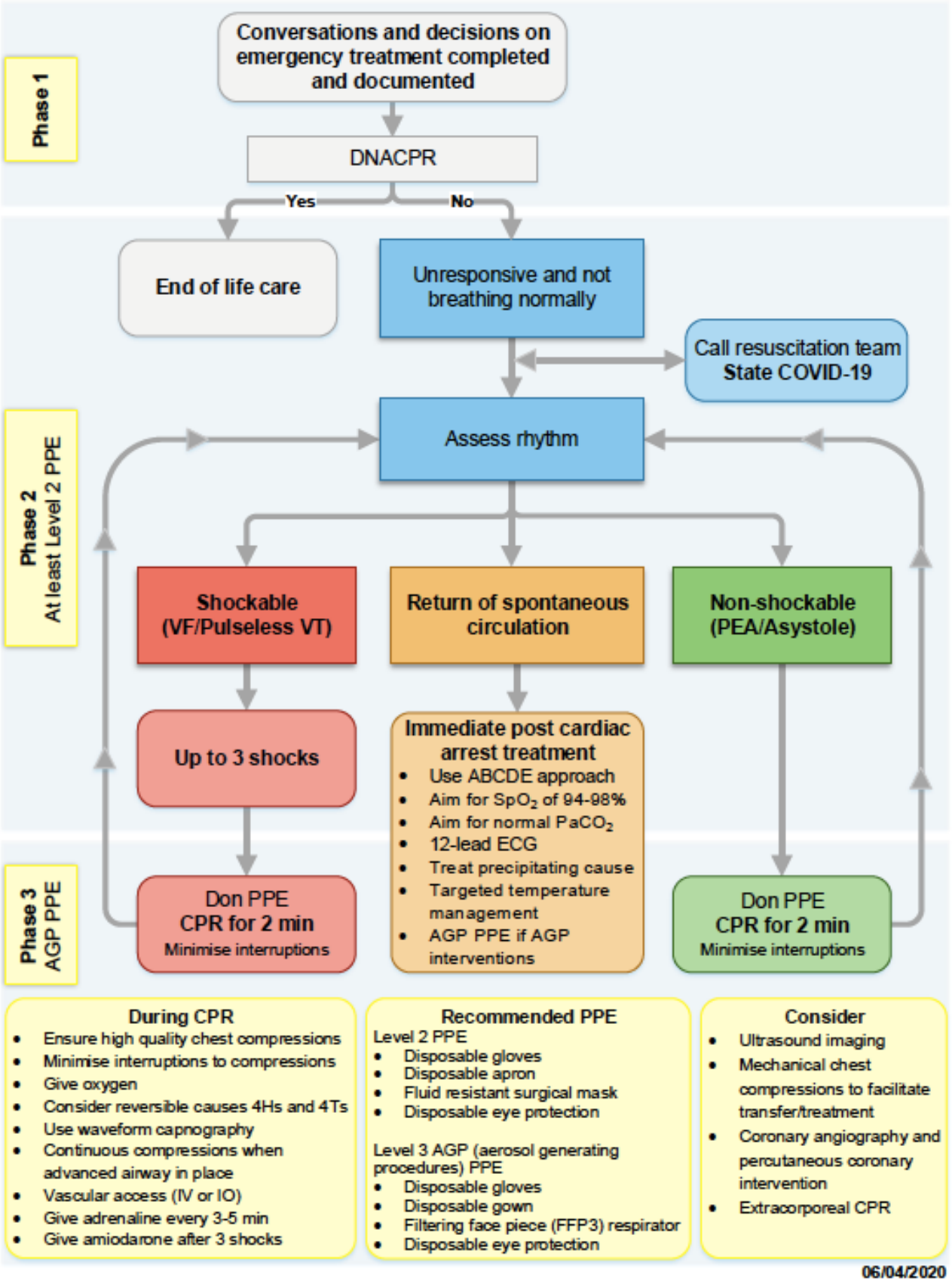
https://www.resus.org.uk/_resources/assets/attachment/full/0/36193.pdf

Reference:

https://www.resus.org.uk/media/statements/resuscitation-council-uk-statements-on-covid-19-coronavirus-cpr-and-resuscitation/covid-healthcare/

Resuscitation Council UK

Adult Advanced Life Support for COVID-19 patients – Acute hospital settings



25. Relocation of resources

Prof Shafi Ahmed

● Design ward space and beds effectively with designated covid and non-covid wards

● Task-shifting. As intensivist manpower becomes scarce, consider enlisting other specialists will help to manage critical patients while intensivists focus on procedures and ventilator management.

● As elective surgery is cancelled, and ward work is reduced consider redeploying staff. Junior staff should cross cover and consultants should be flexible.

● Develop staff absence policy. Establish when to test, when safe to return to work and paid sick leave.

● Monitor morale. Recognize that low morale may occur in situations where staff feel.

unsafe or have little or no control. These feelings of helplessness may increase the risk of error.

● Plan for wellness and sustainability. Recognize signs of acute stress disorder.

● Sleeping quarters. Consider sleeping arrangements for staff wanting to protect families and isolate.

● Deploy quarantined staff. Consider using staff isolating at home for telephone follow ups, communications, journal research, etc.

● High risk staff. Identify staff at higher risk of severe illness from COVID19. Develop

policies to mitigate exposure.

● Manage stigmatization. Recognize that staff and patients' families are being stigmatized in the community.

● Burn rate on PPE supply. Your facility will use greater quantities of personal protective equipment (PPE), oxygen equipment, and isolation rooms than initially thought.

● Based on your current protocols, determine the daily use for a patient in isolation for the following: gloves, surgical masks, N-95 masks, and gowns. A spreadsheet to help with this calculation is here: https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/burn-calculator.html

● Training and communication is crucial for all staff and should have full time staff employed for this.

● N95 fit. Fit-test all staff as far ahead as possible. A proper fitting can take 30 minutes.

● Conserving supplies. Be prepared to reuse N95 and CAPR/PAPR equipment. Create cleaning protocols for reuse of masks and hoods. Understand what solutions adequately kill coronavirus. Alcohol solution may not be adequate.

● Increased length of stay. Hospital length of stay will increase due to slow recovery from respiratory issues and disposition issues when COVID+ patients are ready for discharge.

● Staffing concerns. Staff will become ill, quarantined, and may have difficulty getting to work. Childcare for staff families is a consideration. Solicit additional manpower. Have a process ready

for emergency credentialing. Develop policy on sick leave. Some departments may shoulder more workload than others: critical care nursing, respiratory therapy, housekeeping, intensivists, hospitalists.

● Workforce shortages. Expect critical care staffing to be impacted the most, especially nursing and respiratory therapy.

● Cleaning. Identify appropriate cleaning solutions. Establish cleaning protocols of the environment. Build in additional time to clean rooms and radiology facilities.

● Telemedicine and video capabilities. Consider virtual clinical services to reduce exposure and PPE use.

● Rapidly changing guidelines. Guidelines may evolve more quickly in response to the environment on the ground.

- Make provision of oxygen supply. The treatment of this condition is mostly supportive. Most of the patients will improve with oxygen therapy and supportive management.

Practical problems in Bangladesh that needs addressing:

Dr. Sabyasachi Roy

1. **Observation and vital signs scoring system:** Developing scoring system (based on observations of vital signs) will enable early interventions on deteriorating patient.

2. **Automatic Vital Parameter Machine**: Junior doctors in most government hospitals spend their morning ward job by manually measuring BP, pulse, respiratory rate. This not only increases the exposure to COVID 19 but also delays patient management. Using automated vital parameter machine reduces the work load of the junior doctors and frequency patient contact in the current COVID situation.

3. **Triage system**: Development of triage system in the emergency department will enable better patient flow through the hospital and also enable identification of potential COVID patients at the front door. This will prevent the non COVID ward areas of the hospitals from becoming populated by undiagnosed COVID cases.

4.**Intercom phone in oncall room**: Provision on intercom phone/ bleep systems in essential to the proper functioning of a hospital. This will make the front line doctors in the hospital more accessible to the area of need and enable early review of deteriorating patients by improving the communication system.

5. **ECG machines** should be available at emergency departments.

6. **Blood Gas machine** is essential in the ward management of deteriorating patients and should be easily available in every hospital.

7. **Proper disposal of clinical waste** is essential for infection control. There should be provision of sharp bins and proper place for disposal of contaminated PPE after use.

Some frequently asked questions

Dr. Snehashish Banik

Q: Who would need oxygen therapy?

A: The following situations will warrant immediate supplemental oxygen therapy:

1. Severe acute respiratory infection and *respiratory distress*
2. Hypoxaemia; SpO_2 <90%
3. Shock

Q. What are the essential tools required in relation to oxygen therapy?

A: Clinical areas providing care for COVID-19 should have the following equipment:

1. *Pulse oximeters*

2. Functioning oxygen systems

3. Disposable, single-use, oxygen-delivery interfaces eg: nasal cannula, simple face mask & mask with reservoir bag

Q: How to start Oxygen and how to titrate?

A: Start Oxygen at the rate of 2 L/minute. Titrate flow rates to reach a target SpO_2 ≥90% during resuscitation. Use a face mask with a reservoir bag (10-15 L/minute) if the patient is in critical condition.

Q: How to monitor patients with Oxygen Requirement?

A: Once the patient is stable, target SpO2 is 88-96% for all patients; (Caution: COPD). If patient is hypoxic (<88%) despite having Oxygen at 15L/min (FiO2>60%). A trial of high-flow nasal oxygen or non-invasive ventilation (e.g. CPAP or BiPAP) in patients with hypoxaemic respiratory failure may avoid the need for intubation and mechanical ventilation.

References

1. WHO. Clinical management of Severe Acute Respiratory Infection when COVID-19 disease is suspected: Interim guidance. https://www.who.int/docs/default-source/coronaviruse/clinical-management-of-novel-cov.pdf?sfvrsn=bc7da517_2. March 2020
2. BMJ Best Practice. Corona virus disease 2019. https://bestpractice.bmj.com/topics/en-gb/3000168/management-approach. April 2020
3. Oxygen Targets in COVID-19 With ARDS: What's Optimal? Aaron B. Holley, MD. Medscape Pulmonary Medicine. https://www.medscape.com/viewarticle/928601. April 2020.

26. Future directions

Dr Zahed Ikram; Dr Tasbirul Islam

1-Specific therapy:

Remdesivir: Results from the preliminary trial (1090 participants) showed Remdesivir improved recovery time for coronavirus patients from 15 to 11 days and survival benefit, with a mortality rate of 8.0% for the group receiving Remdesivir versus 11.6% for the placebo group (p 0.059). FDA plans to announce an EUA for Remdesivir very soon.

Convalescent plasma: Convalescent plasma was used with success in SARS and MERS but didn't show any benefit in Ebola. Small Chinese study showed all 5 critically ill patient who received convalescent plasma improved and extubated. Another Chinese study on 10 critically ill patient showed improvement in all parameters (clinical, laboratory and imaging). FDA approved the use of convalescent plasma.

JAMA. 2020;323(16):1582-1589. doi:10.1001/jama.2020.4783

PNAS April 28, 2020 117 (17) 9490-9496; first published April 6, 2020

Tocilizumab: COVACTA trial involving 330 patients started in April'20 and expected to finish in Sept'20. **RECOVERY** trial (6770 patients) in UK is also going on.

2-Serology test:

There are more than a hundred serological tests for Covid19 in USA. Investigators are still trying to find out which ones are good and useful. They all have a lot of false positives and negatives. When the right one is found, it will be useful to figure out population prevalence but it is unclear whether it will help in diagnosis. The finger blot tests are much poorer than blood sample tests. Also, we may need to know antibody titres to know what level of protection someone has.

3-Vaccine Trial:

*Generally, vaccines must go through three progressively more stringent human trial before considered to be safe and effective.

*102 teams working on vaccine.

*8 have permission to do human trial.

*US based MODERNA biotechnology has started human trial on March 16th. They are using a genetic platform called mRNA. 45 participants.

*Prof Sarah Gilbert, Oxford based vaccinologist has started trial in late April'20. She is using a harmless chimpanzee virus to carry the fragment of SARS-CoV-2. More than 500 participants.

Useful online resources

- https://www.cebm.net/oxford-covid-19-evidence-service/ (most useful for latest updates on medical therapy. This is maintained by the Oxford COVID-19 evidence service)
- https://www.england.nhs.uk/coronavirus/
- https://www.gov.uk/government/organisations/public-health-england
- https://www.rcseng.ac.uk/coronavirus/ (most useful for surgeons)
- https://covid.medicalrealities.com/
- https://www.cdc.gov/coronavirus/2019-ncov/index.html
- https://www.england.nhs.uk/coronavirus/wcontent/uploads/sites/52/2020/04/C0256-specialty-guide-oxygen-therapy-and-coronavirus-9-april-2020.pdf
- WHO guidance masks https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks
- https://www.rcog.org.uk/en/guidelines-research-services/coronavirus-covid-19-pregnancy-and-womens-health/coronavirus-covid-19-and-gynaecological-services/
- https://www.resus.org.uk/media/statements/resuscitation-council-uk-statements-on-covid-19-coronavirus-cpr-and-resuscitation/covid-healthcare/

Acknowledgements

We are very grateful to **Dr. Sabyasachi Roy, Dr. Parul Akhtar** (and other members of the **SSMC Alumni Association, UK)** and **Dr. Sajid Muhaimin Choudhury** (Assistant Professor, Department of Electrical and Electronic Engineering, BUET; http://sajid.buet.ac.bd) for compiling the whole document.

Special thanks to **Dr Samia Mubin** and **Dr Arifa Siddika** for coordinating the cross-country communications.

We are also grateful to the following people for their advice with the preparation of the manuscript: **Dr. Andrew Johnson,** Consultant Intensivist, Oxford University hospitals and **Dr. Katie Jeffrey**, Director, Nuffield dept of infectious diseases, Oxford University Hospitals.

The cover page is taken from pixabay.com (by @enriquelopezgarre).